Abstract

Young adolescents attend middle school subsequent to elementary school and prior to entering high school. As a result of both the specific age group on which they focus (generally 10-15 years old) and the lack of subject specialization, recent research suggests that middle schools should offer an interdisciplinary curriculum, in which students learn subjects in conjunction with one another, rather than as entities in and of themselves (Lewis, 1992; Beane, 1991, 1993). One method to help middle schools accomplish this goal is by the creation and maintenance of a school website that reflects middle schools’ interdisciplinary approach. The purpose of this study was to evaluate the extent to which middle schools’ websites reflect these goals and meet criteria for an effective school website as deemed by Gaskill, (1998) and Schrock, (2003) as well as to develop a pre-determined checklist based on the fusion of literature for effective middle schools, the purposes of school websites, and effective website design.

Introduction

Recently there has been a renewed focus by educators to involve both parents and the community in the teaching and learning environment. With the increase in Internet connectivity of both schools and other stakeholders in the educational process (Chen, 2002; National Center for Education Statistics, 2003; Schofield & Davidson, 2002; U.S. Department of Commerce, 2001), one method that has grown in popularity of late is the development of a school website. A school
website can be easily developed and maintained at a school, and can potentially serve a number of purposes, such as providing information about the school, communication with parents and the local community, and the display of student work (Ivers & Barron, 1999; McKenzie, 1997; THE Journal, 2000). In addition, because the Internet is truly a worldwide phenomenon, a website can allow a school to enter the global community. Images and hyperlinks have the potential to give outsiders the ability to “listen in to [the] conversation” that members of the school community are conducting. The creation and utilization of a website can help middle schools achieve their goals, as it fosters collaboration among teachers, students, and administrators, while at the same time encouraging an interdisciplinary curriculum.

A Brief History of Middle Schools

At the beginning of the twentieth century, schoolchildren in the United States attended two types of schools: a K-8 institution as well as a high school, which served grades 9-12. By the 1930s, educators began to advocate the notion of junior high schools for grades 7-8 as a method of not only preparing students for high school, but meeting the distinctive cognitive needs of young adolescents (Beane, 1993; Wiles & Bondi, 2001). Due to a concern that these schools did not cater to the specific needs of the population that they served, the idea of a middle school started to come about in the 1960's as a way to focus learning programs on young adolescents (Cruz, 2003; Beane, 1990; Alexander & McEwin, 1984; Clark & Clark, 1993). The term “middle” was used as a descriptor not only for the schools themselves, but for the students that they served, as these institutions were designed to meet the needs of young people who were between being a child and an adolescent (Alexander, Williams, Compton, Hines, Prescott, & Kealy, 1969).

Middle school students are unique in that not only does their physical appearance undergo development, but they are in a state of change socially and emotionally as well (Knowles & Brown, 2000). Middle school students also experience intellectual growth as they become better able to think abstractly (Knowles & Brown, 2000). However, each individual student changes physically and cognitively at different rates (Knowles & Brown, 2000). In order to achieve the distinct goal of teaching preadolescents in a manner developmentally-appropriate while simultaneously preparing them for high school, middle schools utilize several unique features such as teams, an interdisciplinary curriculum, and advisories (Wiles & Bondi, 2001; Beane, 1993, National Middle School Association, 1996). The overarching goal of these innovations in instruction is to foster an individualized, student-centered learning environment in which students are able to explore new concepts (Wiles & Bondi, 2001). The notions of teams and an interdisciplinary curriculum can be integrated, as teams may consist of
teachers from different academic subject areas who share a particular group of students. Teams can plan for activities that not only integrate subject areas, but also can design instruction that meets the particular needs of their shared learners, since the same students are shared by each of the teachers (Wiles & Bondi, 2001; Wormeli, 2001). An advisory, which consists of a small group of students and a teacher, was designed to function as a “caring environment” for students, in which one of the goals is to “mediate between academic and social concerns” of students (National Middle School Association, 1996, ¶ 10). Each of these three features helps to create the unique environment that is present in many middle schools.

**Middle School Websites**

School websites are becoming much more prevalent for two primary reasons: the increase in the number of schools connected to the Internet and an increase in home Internet access for students and parents (Chen, 2002; National Center for Education Statistics, 2003; U.S. Department of Commerce, 2001). As the popularity of school websites increase, the goals of these sites need to parallel the goals of middle schools. There are two overarching goals of school websites. First, they act as information systems for site visitors, providing a wide variety of data and information. Second, they serve as interfaces between the school, parents, and the community (McKenzie, 1997). Related to these two goals are a number of sub-goals of school websites. These sub-goals include: 1) introducing educational stakeholders to the school; 2) providing various opportunities for student work to be published in both the local and global communities; 3) acting as an intermediary to a larger body of information; and 4) providing a rich, locally relevant data source related to various instructional topics (McKenzie, 1997).

**Introduction to the school**

One important purpose of middle school websites is to serve as an effective introduction to the offerings, character, look, mission, and environment of the school. Introductions via school websites could include a variety of information, such as a picture of the school, demographic information of the student body, school accountability information, faculty/staff information, course offerings, resource information, and more. Specific middle school information, such as advisories and teams can also be displayed. This information is beneficial for both current and potential students and parents, as well as other stakeholders in the educational process.

**Publishing Student Work**
Another important purpose of middle school websites is to provide opportunities for students to publish their work to both a local and global community. This is important because not only does this further introduce website visitors to the school, but also has important benefits for student learning. Many studies have reported various benefits of the publication of student work to the World Wide Web. For instance, publishing to the web can be motivational for many students (Dixon & Black, 1996; Routman, 1991). Also, Riley & Roberts (2000) and Schofield & Davidson (2002) reported that the publication of student work to the World Wide Web resulted in improved attitudes toward the curriculum and increased student achievement. Other benefits of web publication allow students to illustrate what they know and are able to do in relation to a specific topic. Web publication also promotes student reflection regarding their individual growth and development (Snyder, Lippincott, & Bower, 1998). Web publication permits students to envision easily a purpose to their work (Spitz, 1996; Willet-Smith, 1993). The publishing of student work though a website offers an opportunity for teachers and students alike to show to the world how an interdisciplinary curriculum was taught through problem-based learning, as well as to describe a service learning project or activity.

**Intermediary to a Larger Body of Information**

Another major purpose of middle school websites is to act as an intermediary to external sources of information. School websites can provide resources for students, parents, and teachers. School websites can also provide various guidance tools and additional information. Student resources could include an assortment of curricular tools not only in the four core subject areas, but others as well, such as the arts or languages. Web-based resources could contain items such as Internet search tools, tutorials, help/homework centers, remediation tools, and additional enrichment resources. Additionally, pages of a middle school website could be devoted to describing the overarching philosophy of middle schools, or more specifically, could depict a recent service project that a school or team has undertaken, replete with photos and student memoirs. In recalling such experiences, it is likely that student learning would be reinforced.

As a teacher resource, the school website could include links to various lesson plans related to the middle school curriculum, tutorials, and other resources to enhance the teaching and learning environment. For parents, middle school websites could provide links to resources regarding topics such as child safety, parent-teacher organizations, and other collaborative efforts. As an intermediary to a larger body of guidance resources, the middle school website could include items such as college-university information, scholarship and other financial aid sources, career guidance information, and SAT and other test preparation resources. Providing references to these extra-middle school issues can have
benefits for stakeholders in the educational process.

Data Source

There are many ways in which school websites can serve as data sources. First, middle school websites can serve as data warehouses, storing a variety of data for students to utilize in the various learning situations (McKenzie, 1997). For example, locally relevant scientific data, such as weather and economic issues, could be stored and extracted by students in a variety of interdisciplinary, problem-based teaching and learning scenarios. Middle school websites allow for easy storage, searching, and retrieval of this raw data by students. Middle school websites can also allow students to add to the collection of data on the website itself. Clearly, middle school websites can serve as a source for student publication to the World Wide Web, as well as a continually growing database of information for future students. There is also the fact that with the recent changes in school accountability, schools can provide data on past and recent standardized test scores. From here it is easy to compare data with middle schools across the district, state, and nation.

Rationale for the Study

Technology, and the Internet in particular, are becoming a common feature of the school landscape. One illustration of this fact is that 99% of schools had an Internet connection in the fall of 2002 (National Center for Education Statistics, 2003). In addition to utilizing the Internet for information, schools are becoming participants in the World Wide Web, illustrated by the fact that 86% of public schools that have an Internet connection also have a school website (National Center for Education Statistics, 2003). The creation of a school website lends itself well to the overarching theme of a middle school and its curriculum as teachers can work in teams to integrate subjects (Wormeli, 2001). As teachers work together in developing an interdisciplinary curriculum, integration and collaboration can be enhanced by taking advantage of the instantaneous posting and retrieval of ideas a website permits. Furthermore, different pages within the site can be dedicated to ongoing collaborations and ideas. Teacher educators have encouraged the introduction of technology into instruction in this manner, as they have advocated its use as a tool to support teaching and learning rather than a standalone tool (Bell & Hofer, 2003; Flick & Bell, 2000; Garofalo, Drier, Harper, Timmerman, & Shockey, 2000; Mason, Berson, Diem, Hicks, Lee, & Dralle, 2000).

Not only can a middle school website be a reflection of each middle school’s particular curriculum, but the creation of the website itself can take place in teams,
with different groups responsible for different components of the site. In addition to a middle school’s website serving as a tool to communicate with parents, it can also demonstrate the uniqueness of the individual school. Middle school websites can describe school organization in terms of teams, advisories, an interdisciplinary curriculum and problem-based learning, as well as describe a particular school’s relation to the overall theme of middle schools. A middle school website can also contain contact information and separate pages for parents, students, community members, web resources, and a page describing how the particular school’s organizational structure reflects the general theme of middle schools. This study seeks to examine the extent to which middle schools around the country utilize websites to both identify themselves and to serve as a contact point with students, parents, and the community.

Method

The various features that are contained on middle school websites and the degree to which these websites reflect the overall mission of middle schools was studied using a checklist that could be summarized using quantitative descriptors. Although the websites were studied in a quantitative fashion, there were certain aspects of the evaluation such as download time and facility of site navigation that were subjective in aspect. These defining features of a website could be interpreted differently by different people. As Gladwell (2005) explains in Blink: The Power of Thinking Without Thinking, one’s “adaptive unconscious” (in other words, their very first impression) can “fundamentally shape” how something is viewed (p. 13). In respect to a website, the first viewing of the color scheme or placement of images might have unduly influenced the researchers in terms of rating the site in its entirety. It is clear that there was a degree of subjectivity, however small, in terms of the manner in which the quantitative results were derived. In order to address this potential for bias, the researchers ensured inter-rater reliability through each evaluating five websites that the other had also reviewed. These results were within three points on a 100 point scale.

To carry out the study, the researchers randomly sampled 50 middle school websites and offered their evaluation, based on a pre-determined checklist (see Appendix A). The criteria for what should be included (and consequently excluded) from this checklist was determined by a fusion of literature on the goals and mission of middle schools, the purpose of school websites, and general web design features.

In order to find middle school websites to examine at random, a Google™ search on “middle schools” was performed. The initial search found over 6 million websites that contained the exact phrase. To select which schools to examine, we simply chose 50 websites in a directed fashion. Google™ presented the search
results in groups of 10, and a point was made not to choose more than one school from any 10 on one display page. In order to maximize the diversity of our findings, the researchers made an effort to examine middle school websites from different states. Each website was scrutinized by comparing items on the checklist to the site, and through interpretation of the general look, feel, and functionality of the site as a whole. Each of the websites’ scores was determined by giving one point for each of the design issues, and two points for each of the structure, content, and general issues. The maximum number of points possible from the scale was 100. This is illustrated in Table 1. It should be noted that the scoring system was the basis of the research itself. The overall evaluation of middle school websites took place subsequent to the amalgamation of the results from each individual middle school website.

Developing the Checklist

Design Issues

Checklist issues related to design were derived from the Web Style Guide, 2nd edition (Lynch & Horton, 2004). Major areas of focus included were interface design, page design, layout issues, graphic design, site design, and typography issues. Factors related to basic interface design were creating a user-centered design and ease of navigation. Page design issues that were considered included page consistency; having a visual hierarchy; page dimensions and length; page layout; and cross-platform issues. Also important to take into account were site design issues, such as organization of information and general site structure. Graphics and typography issues such as location of graphics and text; alignment and size; typefaces; and consistency were also considered in the development of the checklist criteria. The four major web design principles of contrast, repetition, alignment, and proximity (Williams & Tollett, 2000) were considered. With these elements taken into account, a list of web design-related checklist items was generated. The list was then re-examined for elements that were unsuitable or repetitive. The final list of 34 design items was used in the Middle School Webpage Checklist.

Structural Issues

The eight structural issues included in the checklist were derived from the Web Style Guide, 2nd edition (Lynch & Horton, 2004). The major areas considered in the development of these criteria were primarily interface and multimedia design. Issues related to navigation, size of graphics, and organization of information were taken into account in the development of the structural checklist criteria. The list of potential checklist items was developed and re-examined by the
Content Elements

The 20 content elements criteria were primarily generated from a review of the literature related to both the goals of school websites and the goals of middle schools. Primary goals of middle schools include fostering communication between all stakeholders in the educational process; encouraging an interdisciplinary curriculum; providing a caring environment for students; and to “mediate between academic and social concerns” of students (National Middle School Association, 1996, p. 10). The primary goals of school websites include providing a wide array of information to site visitors and acting as an interface between schools, parents, and communities (McKenzie, 1997). Examining the parallels between these goals, general content criteria, and both parental and student content criteria were developed. These criteria were then examined and inappropriate or repetitive elements were removed.

General Elements

The general elements criteria were developed through a cursory examination of a number of university and K-12 school websites and through discussions with K-12 teachers and parents. Criteria in the “general elements” section were items that various participants cited as important, but did not align with any of the other checklist categories.

Table 1: Middle School Websites: Evaluation Criteria Scale

<table>
<thead>
<tr>
<th>Component</th>
<th>Number</th>
<th>Point Value</th>
<th>Total Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>34</td>
<td>1</td>
<td>34</td>
</tr>
<tr>
<td>Structure</td>
<td>8</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>Content</td>
<td>20</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>General</td>
<td>5</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

The quantitative results of the examination of the different middle school websites were analyzed by using descriptive statistics for the checklist. There was no predetermined number of middle school websites to study; rather, the researchers continued to examine middle school websites and “gather additional data until their analysis show[ed] that they are learning nothing new” (Krathwohl, 1998, p. 166). This point was reached after examining 50 middle school websites.
Results Design Issues

Middle school’s websites were given an overall score as well as rated on individual characteristics. The site as a whole could be rated from 90-100, (exemplary) 80-89, (good) 70-79, (average) 60-69, (below average) and below 60 (poor). Among the 50 sites that were scored, there was a fairly even distribution of scores, as nine (18%) were exemplary, 12 (24%) were good, 11 (22%) were average, 7 (14%) were below average, and 11 (22%) were poor (see Table 2). Overall, it was evident that there was an even distribution as no state or region had consistently higher scoring school websites than other states/regions. Table 3 illustrates overall scores for each individual site.

Table 2: Middle School Websites: Overall Site Scores Summary

<table>
<thead>
<tr>
<th>Score Level (Range)</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exemplary (90-100)</td>
<td>9</td>
<td>18 %</td>
</tr>
<tr>
<td>Good (80-89)</td>
<td>12</td>
<td>24 %</td>
</tr>
<tr>
<td>Average (70-79)</td>
<td>11</td>
<td>22 %</td>
</tr>
<tr>
<td>Below Average (60-69)</td>
<td>7</td>
<td>14 %</td>
</tr>
<tr>
<td>Poor (below 60)</td>
<td>11</td>
<td>22 %</td>
</tr>
</tbody>
</table>

Table 3: Middle School Websites: Individual Site Scores

<table>
<thead>
<tr>
<th>Website Code</th>
<th>Design</th>
<th>Structure</th>
<th>Content</th>
<th>General</th>
<th>Overall Score/Rating</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>050</td>
<td>34/34</td>
<td>16/16</td>
<td>34/40</td>
<td>6/10</td>
<td>90:EXEMPLARY</td>
<td>GA</td>
</tr>
<tr>
<td>049</td>
<td>34/34</td>
<td>16/16</td>
<td>38/40</td>
<td>6/10</td>
<td>94:EXEMPLARY</td>
<td>TX</td>
</tr>
<tr>
<td>048</td>
<td>33/34</td>
<td>16/16</td>
<td>38/40</td>
<td>0/10</td>
<td>87:GOOD</td>
<td>CA</td>
</tr>
<tr>
<td>047</td>
<td>34/34</td>
<td>14/16</td>
<td>36/40</td>
<td>4/10</td>
<td>88:GOOD</td>
<td>SC</td>
</tr>
<tr>
<td>046</td>
<td>30/34</td>
<td>10/16</td>
<td>32/40</td>
<td>2/10</td>
<td>72:AVERAGE</td>
<td>OK</td>
</tr>
<tr>
<td>045</td>
<td>34/34</td>
<td>16/16</td>
<td>34/40</td>
<td>6/10</td>
<td>90:EXEMPLARY</td>
<td>CT</td>
</tr>
<tr>
<td>044</td>
<td>34/34</td>
<td>16/16</td>
<td>38/40</td>
<td>6/10</td>
<td>94:EXEMPLARY</td>
<td>GA</td>
</tr>
<tr>
<td>043</td>
<td>33/34</td>
<td>16/16</td>
<td>34/40</td>
<td>6/10</td>
<td>89:GOOD</td>
<td>UT</td>
</tr>
<tr>
<td>042</td>
<td>29/34</td>
<td>12/16</td>
<td>26/40</td>
<td>4/10</td>
<td>71:AVERAGE</td>
<td>VT</td>
</tr>
<tr>
<td>041</td>
<td>34/34</td>
<td>16/16</td>
<td>36/40</td>
<td>6/10</td>
<td>92:GOOD</td>
<td>MA</td>
</tr>
<tr>
<td>040</td>
<td>34/34</td>
<td>16/16</td>
<td>30/40</td>
<td>4/10</td>
<td>84:GOOD</td>
<td>WI</td>
</tr>
<tr>
<td>039</td>
<td>22/34</td>
<td>10/16</td>
<td>30/40</td>
<td>4/10</td>
<td>66:BELOW AVG.</td>
<td>OH</td>
</tr>
<tr>
<td>038</td>
<td>34/34</td>
<td>16/16</td>
<td>34/40</td>
<td>0/10</td>
<td>84:GOOD</td>
<td>NY</td>
</tr>
<tr>
<td>037</td>
<td>34/34</td>
<td>16/16</td>
<td>38/40</td>
<td>4/10</td>
<td>92:EXEMPLARY</td>
<td>SD</td>
</tr>
<tr>
<td>036</td>
<td>24/34</td>
<td>8/16</td>
<td>4/40</td>
<td>0/10</td>
<td>36:POOR</td>
<td>WA</td>
</tr>
<tr>
<td>035</td>
<td>34/34</td>
<td>14/16</td>
<td>28/40</td>
<td>2/10</td>
<td>78:AVERAGE</td>
<td>MN</td>
</tr>
</tbody>
</table>
Table 4. Middle School Websites: Design Issues

<table>
<thead>
<tr>
<th>Number</th>
<th>Percent</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>50/50</td>
<td>100 %</td>
<td>The website has a name.</td>
</tr>
<tr>
<td>49/50</td>
<td>98 %</td>
<td>The text fits on the screen (very little vertical scrolling).</td>
</tr>
<tr>
<td>47/50</td>
<td>94 %</td>
<td>No horizontal scrolling.</td>
</tr>
<tr>
<td>42/50</td>
<td>84 %</td>
<td>The homepage is attractive, has strong eye appeal.</td>
</tr>
<tr>
<td>45/50</td>
<td>90 %</td>
<td>All pages use adequate margins and white space.</td>
</tr>
</tbody>
</table>
A title appears on all pages.
The site appearance is consistent throughout.
The site is not cluttered.
There is navigation back to the site home page on all pages.
Each page provides some context for a visitor arriving from outside the site.
Each page has one focal point.
Pages use an easy to read font, preferably a sans serif font (e.g., Verdana, Arial, Helvetica).
There are no more than two fonts in the site.
The text is large enough for mature readers.
All underlined text is hot-linked. (Book titles may be all capitals or italicized.)
Large blocks of text are not center-justified.
There is a reasonable balance between head and navigation elements and page content.
Any buttons clearly indicate "This is a link."
There is consistency with the overall color.
There is consistency with the button color.
There is consistency with the position of navigation bar.
There is consistency with the font on buttons.
There is consistency with the text on buttons.
There is consistency with the contrast.
Buttons and/or bread crumbs lead the user back to the home page.
Internal and external links are working properly (no dead ends, no incorrect links, etc.)
Background color and design are not intrusive.
Use subtle textures for background.
Text and link colors are distinct from one another.
The pages use color consistently.
Graphics relate to the site theme.
ALT labels are included with all graphics, including any navigational buttons.
Graphics links have a matching text link unless the graphic link is obvious.
Graphics are optimized for minimum download time consistent with quality.

Structure Issues

The majority of websites surveyed scored well on structure component as well, as the mean score was 13.08 out of a possible 16, (82%) with a standard deviation
of 2.92. Once again, the scores were in relative proximity, as the range was 12 (see Table 5). The homepage of every school surveyed downloaded efficiently, and there were no heavy graphics on 49 out of the 50 sites. While each site scored well in terms of ease of navigation, scores dropped significantly in terms of whether there were particular page(s) devoted to parents, faculty/staff, and students. While 72% of the sites had page(s) for faculty/staff, only 58% and 56% had page(s) for parents and students respectively.

Table 5. Middle School Websites: Structure Issues

<table>
<thead>
<tr>
<th>Number</th>
<th>Percent</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>49/50</td>
<td>98 %</td>
<td>The page is easy/quick to load (no heavy graphics).</td>
</tr>
<tr>
<td>50/50</td>
<td>100 %</td>
<td>The homepage downloads efficiently.</td>
</tr>
<tr>
<td>47/50</td>
<td>94 %</td>
<td>User is able to move around within the site with ease.</td>
</tr>
<tr>
<td>44/50</td>
<td>88 %</td>
<td>Information is easy to find (no more than three clicks, for example).</td>
</tr>
<tr>
<td>46/50</td>
<td>92 %</td>
<td>Lists of links are well organized and easy to use.</td>
</tr>
<tr>
<td>28/50</td>
<td>56 %</td>
<td>There is a site specifically for parents.</td>
</tr>
<tr>
<td>38/50</td>
<td>72 %</td>
<td>There is a general site for faculty/staff and visitors.</td>
</tr>
<tr>
<td>29/50</td>
<td>58 %</td>
<td>There is a site specifically for students.</td>
</tr>
</tbody>
</table>

Content Issues

While the average school received a score of 87% and 82% for the design and structure components respectively, there was a drop of 16 percentage points for the content component, as the average school scored 26.52 out of 40, or 66%. However, as can be seen by the standard deviation of 8.97, there was a larger range of scores than on the previous sections (see Tables 6, 7, and 8). It was also apparent that some of the characteristics were found in either a great deal of schools or very few, as not one category scored between 45 and 55 percent, which would signify a characteristic that would be found on just as many middle school websites as not. However, this is not to say that the scores were on either extreme, as no characteristics were found on over 90% of the websites, and none were below 10%. The characteristic found most frequently (on 45 of the 50 sites, or 90%) was there is an index, table of contents, or some other clear indicator of the contents of the site. Among the two lowest scores were student work is illustrated and teacher course/personal sites are available, which scored at 30% and 18%, respectively.

Table 6. Middle School Websites: General Content

<table>
<thead>
<tr>
<th>Number</th>
<th>Percent</th>
<th>Characteristic</th>
</tr>
</thead>
</table>
40/50 80 % The name of the website designer (author) or other contact person is included.
31/50 62 % There is a stated purpose/objective of the Website. (This purpose could be inferred from the title and navigation; it could be a link to "about this site."
45/50 90 % There is an index, table of contents, or some other clear indicator of the contents of the site.
43/50 86 % Site sponsor/provider is clearly identified.
43/50 86 % A working link is provided to a contact person or address for further information.
30/50 60 % There is a footer with last update and an email link on every page.
23/50 46 % A copyright notice is posted where applicable.
39/50 78 % Links to other useful Web sites are provided.
38/50 76 % School calendar is present
37/50 74 % Club/Extracurricular activity information is present.
15/50 30 % Student work is illustrated.

Table 7. Middle School Websites: Parent Site Content

<table>
<thead>
<tr>
<th>Number</th>
<th>Percent</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 /50</td>
<td>40 %</td>
<td>School Administration information is present.</td>
</tr>
<tr>
<td>14 /50</td>
<td>28 %</td>
<td>Teacher contact information is present.</td>
</tr>
<tr>
<td>9 /50</td>
<td>18 %</td>
<td>Teacher course/personal sites are available.</td>
</tr>
<tr>
<td>13 /50</td>
<td>26 %</td>
<td>Conference/Advising/Guidance information is present.</td>
</tr>
<tr>
<td>14 /50</td>
<td>28 %</td>
<td>Testing/Accountability (NCLB) information is available.</td>
</tr>
<tr>
<td>21 /50</td>
<td>42 %</td>
<td>School district information is present (this could include a link to the main school district site).</td>
</tr>
<tr>
<td>21 /50</td>
<td>42 %</td>
<td>School information (map, address, etc.) is present.</td>
</tr>
</tbody>
</table>

Table 8. Middle School Websites: Student Site Content

<table>
<thead>
<tr>
<th>Number</th>
<th>Percent</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 /50</td>
<td>60 %</td>
<td>Student/Child-centered link/resources are available.</td>
</tr>
<tr>
<td>28 /50</td>
<td>56 %</td>
<td>Teacher course sites are present.</td>
</tr>
</tbody>
</table>

General Site Elements

In terms of the general site elements, there was an even further drop, as the average school scored 3.72 out of 10 (37%) on this section and the standard deviation was 1.90 (see Table 9). Although the standard deviation among total
scores on this section was relatively small, there was a separation of 78 percentage points between the highest scoring characteristic (picture of school, which was found on 39 of the 50 sites examined, or 78%) and the lowest scoring characteristic (Bobby-approved, which was not found on any of the sites examined). While at least 70% of the sites examined contained two of the characteristics, (picture of school and updated in the last year), the rates of the other two characteristics were found at a much less frequent rate, as inclement weather information was found on 12 out of 50 sites (24%) and an FAQ page was found on nine out of 50, or 18%.

Table 9. Middle School Websites: General Characteristics

<table>
<thead>
<tr>
<th>Number</th>
<th>Percent</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>39/50</td>
<td>78 %</td>
<td>Picture of school</td>
</tr>
<tr>
<td>12/50</td>
<td>24 %</td>
<td>Inclement weather notifications</td>
</tr>
<tr>
<td>0/50</td>
<td>0 %</td>
<td>Bobby-approved?</td>
</tr>
<tr>
<td>9/50</td>
<td>18 %</td>
<td>FAQ Page?</td>
</tr>
<tr>
<td>37/50</td>
<td>74 %</td>
<td>Updated</td>
</tr>
</tbody>
</table>

Data Analysis

The results demonstrate that while there are encouraging signs of middle school website development, there are also some disheartening aspects that we feel should be addressed. First, it was evident that virtually every middle school website that was studied followed basic design principles as espoused by Williams & Tollet (2000) and Lynch & Horton (2004). While no two sites followed the same color, font, or image pattern, the vast majority conformed to these basic principles. As a result of following these principles, middle schools were able to represent themselves to the world in an organized, logistical fashion, instead of simply haphazardly posting information online. The research indicates that slightly over three-quarters (76%) of middle school websites contained school calendars. By including these characteristics, the websites acted as information systems for site visitors. The websites also served as an interface between the school, parents, and the community, as advocated by McKenzie (1997).

The study indicates that there are also some areas of concern. Most striking to us was the fact that less than a third (30%) of the middle school websites illustrated student work. This was a source of disillusionment, since research has supported student publication on the Internet as a method of motivating students (Dixon & Black, 1996; Routman, 1991) and for increasing their achievement level (Riley & Roberts, 2000; Schofield & Davidson, 2002). The research indicates that a minority of schools are taking advantage of the potential added value of students
posting their work online. In their 1998 work, Snyder, Lippincott, & Bower, offer high praise for students' web publication. Snyder, Lippincott, & Bower argue that it provides a unique forum in which students may espouse their knowledge about a certain topic. If a school website does not have this capacity, it is not possible for students to publish on the Net unless they have access to and the know-how to post to their own server.

The fact that so few middle school websites had contact information for teachers (28%), and even less had teacher course/personal sites (18%), was also disappointing. Websites can affect how a teacher makes course materials such as syllabi and assignments available to students and at the same time help to organize material for students. These features of an online classroom environment decrease the chances of students losing work, as course information can be found with one click of a mouse as opposed to disparate paper locations (Maddux, 1999). A February 2004 survey found that “nearly 75%” of homes in the United States had Internet access, a course website offers an individualized communication channel between teachers and parents that can include student assignments and performance (Nielsen/NetRatings, 2004).

In terms of accessibility, not one of the websites that were examined gave any indication that it had been Bobby-approved. Bobby is a free online service that examines whether individual web pages meet “existing accessibility guidelines” set forth by the World Wide Web Consortium’s (W3C) Web Access Initiative (Watchfire Corporation, 2002). Since Bobby-approval is a worldwide indicator of a website’s “commitment to inclusion” for those with disabilities, it was somewhat disappointing that not one site had met (or indicated that they met) these guidelines, as an overarching goal of public schools is to provide and foster knowledge from diverse populations (Watchfire Corporation, 2002, online).

In terms of performance, given the preponderance of the No Child Left Behind Act (NCLB) as well as state standards in today’s school environment, it was surprising that less than a third of the websites that were surveyed (28%) showed accountability information. In an era when 56 percent of Americans polled felt that firing teachers was warranted “in schools that fail to show progress towards meeting standards,” we anticipated that there would be more of an emphasis on this important facet of schooling in the United States today (Keller & Bichelmeyer, 2004, p. 21). Since advisories (National Middle School Association, 1996) and individualized instruction (Rose, 1999) are important for middle school students, we were also disheartened to find that just over a quarter of middle school websites surveyed (26%) included conference/advising information. It is clear that while this may be taking place within the middle schools themselves, it is not reported on the majority of websites. The end-result being that the school website is not necessarily fulfilling its promise as both a communication tool and source of
While we were impressed with the design features of nearly every middle school website, there were other features such as illustration of student work, accessibility, and testing information that we felt needed to be improved. If one of the primary missions of middle schools is to cultivate a personal, caring environment as Wiles & Bondi (2001) and the National Middle School Association (1996) suggest, we found it perplexing that these characteristics were found with such little frequency. In order for schools to take the “next step” in terms of their web presence, there is a need to go beyond merely providing general information about the school, to providing a resource for parents to find information about their child’s teachers, information such as the syllabus, schedule, and homework for the course(s) their children are taking, and their children’s performance in the course(s).

Implications

As a result of the findings of this study, we have developed a series of suggestions for developing a middle school website. These include developing a shared agenda; planning the site prior to development; designing the site cognizant of future change; following general web design rules; focusing on the benefits of school websites; and considering the site as a potential gateway for teachers.

**Develop a Shared Agenda** When developing a middle school website, it is important to consider the audience of the site. For example, an audience for a middle school site might include parents; pupils; government; prospective students; local investors and community; and school staff. As a result, it is important to provide information that addresses these stakeholders. There are a number of ways to accomplish this goal. First, the intended audience should collaborate on the development of the site. While this not only provides all parties with a sense of “ownership” in the project, it also allows all potential audience voices to be heard in the planning, design, and development of the middle school website.

Another way to accomplish this goal is by tailoring individual webpages within the site to specific audience groups. For example, on a middle school website, there could be a link to a site for parents or a site for students or other stakeholders in the educational process. Considering all potential audience members in the middle school website’s development allows for a shared product in which the goals of multiple voices are addressed.
Plan the site prior to design and development It is also important to plan the site prior to its design and development. One method of accomplishing this is through storyboarding. Storyboarding allows for all stakeholders to examine the site design, structure, and content prior to the design and development of the site. This allows for feedback from multiple potential users to be provided prior to the actual construction of the site begins.

Design the site cognizant of future change/editing The dynamics of schools are constantly changing. Examples of this are evident in such issues as changes in the student body, faculty and staff, test scores dates, and courses taught. As a result, the information conveyed in a middle school website will also change. Therefore, it is essential to plan, design, and to develop a middle school site cognizant of the idea of change. Planning and allowing for expansion are critical to the success and maintenance of a middle school website.

Follow general web design rules The majority of websites examined followed the general principles of design. While many of them did not contain the newest, most modern design, they were adequate and served the schools’ needs. Following these general design features are important to 1) attract visitors to your site, 2) keep visitors at your site, 3) make it easy to find information at your site, and 4) address accessibility issues. It is important to address these two general areas: C-R-A-P and keep it simple.

C-R-A-P Contrast, Repetition, Alignment, and Proximity are the four major web design principles (Williams & Tollett, 2000). Contrast refers to the difference between the site’s background and foreground elements. When designing a site, there should be a significant difference between the two. For example, it would be poor design to use a light yellow font color on a white background. Repetition refers to repeating elements throughout a website. Any elements that can be used multiple times in a site should be repeated when possible. For example, the background color of a site should not change from page to page. Issues such as font style, font colors, overall layout, and navigation structure, should be repeated throughout a website. Alignment refers to the manner in which text and other elements are placed on a webpage. It is best to use a single alignment structure throughout a site. Usually, a centered alignment is safe and provides a sense of balance. Finally, proximity refers to the distance web elements are located from each other. The closer items on a webpage are, the more connected they seem. Placing items further away from each other creates a sense of disconnectivity. When developing a website, it is important to place related items near one another.

Keep it simple There are numerous possibilities with the types of elements that can be integrated into a website, such as scrolling text, animated GIFs, and Flash
media. While these elements aredecorous, they are often unrelated to the goals or objectives of the middle school site. So, there is no need to integrate them into the site. Not only do these elements oftentimes increase download times, but they can also contradict accessibility guidelines. Also, if an individual is maintaining a school site and is utilizing some more advanced functions such as Flash, the transition to another individual maintaining the school site will be much more difficult. A general rule of thumb for middle school websites: simpler is better.

**Focus on the Benefits of School Websites** There are a number of benefits of school websites. These include communication to a wide audience, extended and independent learning resources for students, flexible evaluation tools for teachers, promoting increased involvement of parents, supporting student learning, showcasing student work and school environment, and enhancing relationships between schools and other stakeholders in the educational process. In terms of designing a middle school website in particular, it is critical to address such features as an interdisciplinary curriculum, teaming, advisories, problem-based learning, student-centered learning, and service learning.

**Conclusion**

After a thorough examination of 50 middle school websites, it was clear that although virtually every website followed basic design principles, a good design did not necessarily lead to a high overall score. This was primarily due to the fact that scores dropped off precipitously on the content and general site characteristics. While each of the schools surveyed had a web presence, the majority used their website as a vehicle to post general information about their school, as opposed to creating a site in which students and parents could interact with the website in order to find specific information pertaining to courses or teachers, or particular characteristics germane to the middle school environment.

**Suggestions for Future Study**

This study is well suited to further scholarship. We evaluated 50 middle school websites; this same task could be undertaken for elementary and high school websites. In addition, this study could also be followed by more in-depth studies of high-scoring (or low scoring) schools and the contextual factors that cause certain schools to score at higher (or lower) rates. For example, a sample of five to ten high (or low) scoring schools could be studied through an online survey that focused on the factors that encourage (or discourage) middle school website development and maintenance, and could be supplemented with interviews of the webmaster, administrators, and teachers. Additionally, characteristics that scored low, such as the showcasing of student work on school websites could be
examined. Other areas of research focus include middle school website accessibility. As previously mentioned, no schools evaluated indicated “Bobby-approval.” More in depth evaluation of the accessibility of websites, as well as factors that promote and inhibit middle school website accessibility could be studied. Finally, characteristics of schools that rated both higher and lower could be researched. For example, comparisons of the websites of rural versus urban schools, high student population versus low student population schools, and high performing versus low performing schools would be beneficial in providing context for whether or not school characteristics influence the effectiveness of a middle school website.

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Appendix A

School Webpage Checklist

School Name: _______________________ Level: ___________________

URL:____________________________________________________

Design Issues
The website has a name.  
The text fits on the screen (very little vertical scrolling).  
No horizontal scrolling.  
The homepage is attractive, has strong eye appeal.  
All pages use adequate margins and white space.  
A title appears on all pages.  
The site appearance is consistent throughout.  
The site is not cluttered.  
There is navigation back to the site home page on all pages.  
Each page provides some context for a visitor arriving from outside the site.  
Each page has one focal point  
Pages use an easy to read font, preferably a sans serif font (e.g., Verdana, Arial, Helvetica).  
There are no more than two fonts in the site.  
The text is large enough for mature readers  
All underlined text is hot-linked. (Book titles may be all capitals or italicized.)  
Large blocks of text are not center-justified.  
There is a reasonable balance between head and navigation elements and page content.  
Any buttons clearly indicate "This is a link."  
There is consistency with the overall color  
There is consistency with the button color  
There is consistency with the position of navigation bar  
There is consistency with the font on buttons  
There is consistency with the text on buttons  
There is consistency with the contrast  
Buttons and/or bread crumbs lead the user back to the home page.  
Internal and external links are working properly (no dead ends, no incorrect links, etc.)  
Background color and design are not intrusive.  
Use subtle textures for background.  
Text and link colors are distinct from one another.  
The pages use color consistently.  
Graphics relate to the site theme.  
ALT labels are included with all graphics, including any navigational buttons.  
Graphics links have a matching text link unless the graphic link is obvious.  
Graphics are optimized for minimum download time consistent with quality.

Structure Issues

The page is easy/quick to load (no heavy graphics).  
The homepage downloads efficiently.  
User is able to move around within the site with ease.
Information is easy to find (no more than three clicks, for example). Lists of links are well organized and easy to use. There is a site specifically for parents. There is a general site for faculty/staff and visitors. There is a site specifically for students.

**Content Elements**

The name of the website designer (author) or other contact person is included. There is a stated purpose/objective of the Website. (This purpose could be inferred from the title and navigation; it could be a link to "about this site.") There is an index, table of contents, or some other clear indicator of the contents of the site. Site sponsor/provider is clearly identified. A working link is provided to a contact person or address for further information. There is a footer with last update and an email link on every page. A copyright notice is posted where applicable. Links to other useful Web sites are provided. School calendar is present. Club/Extracurricular Activity information is present. Student work is illustrated.

**Content Elements: Parents site**

School Administration information is present. Teacher contact information is present. Teacher course/personal sites are available. Conference/Advising/Guidance information is present. Testing/Accountability (NCLB) information is available. School district information is present (this could include a link to the main school district site). School information (map, address, etc.) is present.

**Content Elements: Student Site**

Student/Child-centered link/resources are available. Teacher course sites are present.
General Site

Picture of School
Inclement weather
Bobby-approved?
FAQ page?
Site is updated.

References


Cruz, D. J. (1993). Teacher Leaders: Middle School Mathematics Classrooms. *Research in Middle Level Education 26* (2); Retrieved on October 25, 2004 from [http://www.nmsa.org/research/rmle/spring03/rmle_303_article2.htm](http://www.nmsa.org/research/rmle/spring03/rmle_303_article2.htm)


