Government Websites for Children: How Useful are they for Content Instruction?

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In a world connected and driven by technology, classrooms need to reflect the use of computers by students in their everyday lives. Elementary students, as well as older students, understand and use computers outside of school and as a consequence elementary teachers are increasingly asked to use computers in their classrooms.

The federal government is adding technology initiatives to its educational programs, including President Clinton's "National Call to Action" to connect all public schools to the Internet (Office of the Press Secretary, 2000), and President Bush's No Child Left Behind initiative (US Dept of Education, 2002), which requires all students to be 'technologically literate' by eighth grade. In the 2009 stimulus package proposed by President Obama and passed by Congress, six hundred and fifty million dollars are allocated for technology upgrades in schools, and includes money for computer labs and teacher technology training (Hossain et al, 09). These initiatives create an increase in access to technology and spawn local legislation to further improve technology integration in specific states. Both local school districts and state governments are investing considerable amounts of money for the purchase of computers and the training of teachers to use them (McCannon & Crews, 2000; Zhoa & Bryant, 2006).

In US schools in 1981 an average of 125 students had access to one computer. By 2000 the average was 5 students per computer (Cuban, 2001, p 17). This increase in computers in public schools makes possible an increase in internet access in schools. In 1995, Kitchner found that only one-third of American schools had internet connections and the connection was typically in the school library. In the following two years internet access tripled (Traicoff, 1997) and by 2003, 100% of schools had access to the internet either in one location such as the media center or in multiple classroom locations (National Center for Education Statistics, 2005). Now that teachers have computers and access to the internet, how will they use the computers, especially the internet, for content instruction in elementary classrooms? On the internet, how will they know if sites can be used effectively for content instruction?

First Gov for Kids

The websites examined in this pilot study are the result of an agenda set by President Clinton in 1997 for the World Wide Web to be in every classroom by the year 2000. In particular, he wanted those websites sponsored by United States government agencies enriched as a tool for teachers and students. He suggested kid's pages as a possible improvement (Clarke, 2006; Flake, 2001). Consequently most government agencies have webmasters for their websites whose responsibility is to develop parts of their sites for students as an interactive learning environment. Typically they have different levels of activities for primary, upper elementary and middle school to high school students. The student pages are specifically designed for children to learn about different parts of the government of the United States (See Appendix 1).

The portal for all of the student pages is kids.gov and provides links to many government sites as well as some private sites designed for students that contain information on the United States government. The portal is very useful because it is often difficult to find the student pages on large and complex government websites. An example is the US Census Bureau site. In order to access a page with a link to activities for kids on this site, it is necessary to first click on an American Factfinders link on the home page. The kids' link is one of many links on the second page and located at the bottom of the page under the heading of special interests and kid's corner.

Evaluating and Responding to Government Websites for Children

The purpose of this pilot study is to evaluate the usefulness for content instruction of the student pages in websites sponsored by the United States government. Seventeen elementary teachers and seventeen elementary students of various ages examined a group of student web pages. The websites were chosen for content in the major social studies disciplines. Examples are H.I.P. Pocket Change and Money Central Station from the US Treasury website for economics, America's Story from the Library of Congress website for United States history, Peace Corps Kids World for world history and geography, US Census Bureau American Fact Finder for US geography and Ben's Guide for US government, among other sites. After closely examining each website using an evaluation instrument designed for both self-contained stand alone software programs and internet sites (Furner & Daigle, 2004), each teacher asked

an elementary student to use the website and respond to it using a questionnaire (http://discoveryschool.com/ schockguide/). The teachers then wrote a reflective description of their evaluation and the students responses to each site. The findings were evaluated using a continuous data comparison to narrow the categories for evaluation (Glasser and Strauss, 1967).

Why was the Furner & Daigle evaluation instrument chosen? Many evaluation instruments for internet sites exist, but few have a detailed check list for use of the website with young students as The Educational Software/Website Effectiveness Survey (Furner & Daigle, 2004) does. Typically website evaluations are concerned with the validity of the site. The use of United States government sponsored websites in this pilot study considerably lessens the need to determine validity, which is necessary if teachers and students search for sites using a web browser such as Yahoo or Google. Various articles and websites give developed guidelines for judging websites critically for validity (See Alexander, 2001; Barker & Saifon, 2004; Tillman, 2003). These guidelines typically include:

- the purpose of the website, is there a point of view or bias or is the author simply giving information?
- authorship, is the author(s) qualified to write about this particular topic and do they have the necessary background or training?
- the information's authenticity and accuracy, how does it compare to other sources of information on the topic?
- the information's currency, how frequently and how recently has the information on the site been updated
- contact information, can the author of the website or someone at the institution that is sponsoring the site be contacted if there is a question?

Because the sites evaluated in this pilot study were sponsored by the US Government or authenticated before being placed on the portal kids.gov, the questions of validity are not central to the study.

In addition to evaluating a site's validity there are research and guidelines that show how to evaluate the technological features of websites. These technological features are a crucial part of a site's

usefulness for instruction in the classroom. However, these features alone will not make a site useful for instruction; the content of the site must also be assessed (Furner &Daigle, 2004).

The guidelines for useful technological features typically include:

- connectivity of the website, how easily does the website connect to your computer?
- appearance of the website, is the site clearly laid out, are the fonts large enough, is it easy to navigate the site?
- links on the site, do all of the links to other websites work and are they clearly distinguished? What type of websites are linked? Are they valid?
- quality of the multimedia, are the visuals, such as pictures, clear? can video be accessed? is the auditory clear?
- reading level, what is the reading level of text on the site?

Neither the validity of the site nor the technological features of the site fully address the usefulness of the website for instruction in content areas which is the purpose of this pilot study.

The Educational Software/Website Effectiveness Survey instrument that the teachers used to respond to and evaluate the websites has a Likert Scale of 1-4 to rate the websites in a variety of categories. 1 is excellent, 2 is very good, 3 is good and 4 is poor. The evaluation instrument is divided into ten categories with specific questions under each. Using continuous data comparison, the teachers in the study determined that some of the categories pertained more to the evaluation of stand alone software programs than internet sites. Many software programs, in math for example, are designed to teach and reinforce particular skills through drill and practice and feed back to the student and teacher. Most internet sites in this study do not provide that type of skills development with that level of feedback. Consequently the teachers found that some categories in the survey and the specific questions under each category had a limited application to internet sites.

Some of the categories in this survey instrument with a limited application are pace, which is important for software programs that teach a skill such as addition in mathematics; monitoring student progress, which is often used in software programs that students use to practice a skill such as reading comprehension, summarization which helps a student assess progress through a particular skills lesson

and transitions which help a teacher assess a student's progress. In contrast, the student pages on government sites primarily contain content and have games and quizzes in which a student can assess the content knowledge that they learned on the site but without the feedback to student and teacher that are typical of stand alone software programs.

Consequently the teachers in this study focus their evaluations of each site and their observations of the students using the sites in the following categories: the site's age appropriateness and reading level, the ease of use of the website and its level of interactivity, the site's support of content learning and social studies skills, such as map reading and the sequencing of events, and the site's ability to engage and interest a young student.

Findings

The average score for the student pages on all of the websites evaluated in this study using the Educational Software/Website Effectiveness Survey (TESWES) (Furner &Daigle, 2004) was 2.5 which is halfway between good and very good on the 1-4 Likert scale. The student pages evaluated as very good to excellent (1 to 2) were FBI Kid's Page, Safety Tips for Kids, US Census Bureau American Fact Finders, National Park Service Web Rangers, Ben's Guide to the US Government, Smithsonian for Kids and Peace Corps for Kids.

For these sites with high ratings, such as Ben's Guide to the US Government and Safety Tips for Kids, both were judged as excellent sources of information. Safety Tips was evaluated as excellent for relating directly to children's' lives because of the discussion of bike safety and what you should do if approached by a stranger.

The sites receiving a rating of very good to good by the teachers were White House Kids, Kids in the House (of Representatives), United States Patent and Trademark Office Kid's Page, Money Central Station, NASA for Kids and United Nations Cyberschoolbus. The sites with the lowest ratings from good to poor (3-4) were the United States Mint Kid's Page, America's Story from the Library of Congress, Veteran's Administration for Kids and the US Attorney's Kid Page.

All of the sites, even those that received low ratings, such as the Veterans Administration site, were rated as strong on visual graphics and stimulation for the student. One very visually pleasing site is Money Central Station which is full of games that help the student learn about United States currency. However, the third grader who tested the site needed adult supervision in order to play the games and the games did not build on prior knowledge or increase in complexity as the child progressed through the site. Many of the sites such as the United States Attorney's Kids Page and United States Patent and Trademark Office Kid's Pages, were too difficult for young children and the teachers judged that they could be used easily only by fifth grade and above. This assessment was based on the reading level of the sites which tended to be above the second and third grade level and needed assistance from the teacher for younger grades. Many sites combined games with information. Some of the games, such as those on the Veteran Administration site, were easy for a third grader to play but when the student clicked on links to go to sources of information the vocabulary was too difficult.

In one instance the content of the site was criticized by the teacher when the United States Attorney's Kid's Page linked to a page in the US Attorney's office on sexual offenders. The student evaluating the site, the student's mother and the teacher found the link offensive. Most of the sites were criticized for not having a means for the teacher to assess the students' progress in the quizzes and learning games which is an element usually found in stand alone software programs. In order to assess progress the teacher needs to sit with and supervise the student while the student is on the site.

Quizzes on the information in the site were part of each site although many of the quizzes which were interactive did not encourage the student to try again with clues if the first answer was not correct. The quiz would simply say if the student was right or wrong. An exception to this was the National Aeronautics and Space Administration for Kids site which encouraged students to try again if they did not have the correct answer initially. Often it was necessary for the student to read information on the site prior to taking quizzes and playing games. Many of the students who were working independently on the site went directly to the games and quizzes without reading the information first. In terms of engagement of the students' interest, most of the students said that they particularly liked the games on the different

sites, but teachers observed that students spent little time first looking through information on the sites in order to play the games therefore limiting the game as an effective learning experience.

There were limitations to some of the games on the various sites. Many of the sites had matching games in which a student's memory is tested as they turn over various cards and try to match a pair. This activity is stimulation for memory skills but does not necessarily help in building content knowledge on a topic. On some of the sites crossword puzzles and coloring activities had to be printed out in order for the student to complete them. Most students preferred to work directly on the computer and did not want to print out the activities.

In terms of social studies content the teachers thought all sites had good information. However, the reading level for some of the sites was too advanced for young children. The FBI Kid's Page was praised for having reading levels appropriate for elementary students and a second section of reading level that was appropriate for secondary students. The student evaluators commented that several sites, such as the United States Census Bureau's Kid's Page and the Peace Corp for Kid's page would be excellent for geography projects. The teacher who evaluated the United Nations Cyberschoolbus said it would be excellent for geography but the fifth grader using the site did not understand the central theme of peace between all nations that needed to start with the world's children. Many of the sites, such as the Kid's in the House (of Representatives) were excellent for civic understandings and government, whereas a site such as White House Kids had excellent historical components. The US Mint Kid's page was a good source of information on currency but not the workings of economics such as the stock market or the concepts of production, distribution and consumption (See Appendix 2).

Use of Computers in the Elementary Classroom

Teacher's evaluation of websites on the internet for content instruction is one part of a larger context of computer use in elementary classrooms. As well as the nature of the internet itself and its usefulness for students in elementary school, the wider context includes the classroom teacher's attitude towards using computers for instruction, both in the primary grades from kindergarten to second grade

and the intermediate grades from third to sixth, and the comparison of the internet to packaged software programs that can be downloaded to computers after purchase from a software company.

Many elementary teachers find evaluation of websites a very time consuming process even if they have a background in the evaluations of websites, which many do not. Although elementary teachers often take complete pre-service or in-service courses on topics such as the evaluation of children's literature, they seldom have coursework in the evaluation of websites for use in the elementary classroom (Buckleitner, 1999).

There are many websites on the internet that are excellent sources for social studies materials and skills. One of the most significant resources for social studies education on the internet are websites that contain extensive primary documents and artifacts that can be used by students of all ages. These websites with digital collections of primary sources, such as the excellent collection available at the Library of Congress's American Memory Project (http://memory.loc.gov/ammem/index.html), offer a level of direct access to primary documents that was unimaginable only a few decades ago and has the potential to shift learning from teacher directed instruction using secondary sources to student centered inquiry using primary sources (Lee, 2002).

These internet resources, both digital collections, such as the American Memory Project, and other sites with a focus on the social studies disciplines, such as the History Channel and the US Census Bureau, are not easily accessed and used by young children, particularly those in the primary grades, without adult assistance. They are easier to access and use independently by grades four through six but limitations still exist. As found in this study, even sites with interactive components such as colorful graphics and linked icons for young children have reading levels that often are too advanced for the elementary grades [Minkel, 2001]. Usually, the content of websites is still text based and students must apply literacy skills in order to obtain information just as much as with traditional print materials. As in this study, Bangert-Drowns & Pike (2001) found a preference among elementary students for electronic media rather than print media for obtaining information. The students in the study were enthusiastic

about the interactive websites they used but had varying degrees of sophistication with the interpretation of information on the websites and their ability to read the textual material.

For a website to be effective interactively it needs to use the computer as a cognitive tool, not simply as another means of delivering traditional text material. In a study of the use of interactive resources such as interactive maps and timelines in an undergraduate history course it was found that the interactive resources needed to be linked to concrete outcomes and assessments. An interactive map, for example, that had an immediate quiz to check for comprehension was more effective than an interactive map without immediate feedback or assessment (Vess, 2004). These maps and timelines were interactive in that a user could click the mouse on a particular date or location and access pictures, text and maps that explained and developed the particular topic. The teachers in this study discovered a similar shortcoming when checks for comprehension were missing on the websites they evaluated. An example is the interactive timeline under Time Machine on the United States Mint Kids Page.

The use of computers for instruction in elementary classrooms has been linked to a teacher's comfort and level of expertise with computers. Understandably, those who feel more comfortable and knowledgeable with computers will be more likely to use them in classrooms (Garrison & Bromley, 2004, Guha, 2003, McCannon & Crews, 2000). Even those teachers who are comfortable with computers are concerned about other factors that influence computer use. These concerns then increase dramatically with those teachers who do not feel comfortable using the computer in the classroom. A major concern in the past was access to computers. Often there were none in the classroom and the teacher had to schedule time for students in a computer lab that served the whole school (Garrison & Bromley, 2004, Guha, 2003, McCannon & Crews, 2000).

Purchasing computers does not guarantee that they will be used, however. Teachers refer to a lack of training in the use of computers, lack of administrative support and lack of time to integrate computers because of the emphasis on testing created by new federal initiatives (Guha, 2003, McCannon & Crews, 2000). This situation leads to computers being used for rewards for good behavior and accomplishing tasks and not as an integrated part of the curriculum (Garrison & Bromley, 2004). Even

when teachers have training on the use of computers, the training consists of how to use the computer for administrative tasks or using the computer for presentation skills such as Powerpoint. When the training focuses on curriculum integration, the curriculum components may be prepackaged programs purchased by the school district or software that is a self contained instructional program sometimes used for remediation and drill and practice. Sometimes the internet is introduced with a recommendation of particular sights for instruction, but often the recommendation does not include a close and in depth evaluation of the sites and their usefulness for content instruction (Garrison & Bromley, 2004, Guha, 2003, McCannon & Crews, 2000).

Limitations of this Study

Usability testing is a standard practice among large technology corporations such as Microsoft and Apple. This testing usually focuses on the technological features of purchased equipment such as the Apple Ipod or purchased programs such as Microsoft Office. Although usability testing by educators is encouraged, it is typically cited as a need prior to the purchase of expensive equipment or software products, not prior to the use of internet sites for content instruction. The criteria for usability testing typically include how long it takes users to complete tasks, how many errors users make, how much help they need, users' subjective ratings of the system, and, if the application requires training, how much training was needed (Buzhardt and Heitzman-Powell, 2005).

These criteria are most easily applied to software programs and computer applications rather than the internet. For sites such as the ones in this pilot study user's subjective ratings are the most applicable evaluation methodology. With subjectivity come limitations, as demonstrated in this study. As Buzhardt and Heitzman-Powell (2005) point out, if subjective measures; such as surveys containing Likert-type rating scales, interviews with users, and observations of users' facial expressions and verbal comments during usability testing are used; problems occur with variations in users' definitions of usability, and some users' desire to please the tester. Additionally they point out limitations from the context in which the data is collected and the type of users who participate in the usability tests. For example, if the internet site or software is meant for use by teachers during day-to-day classroom activities, it should be tested in

classrooms with teachers and students. The attitudes of users provide insight into feelings about the computer application, software or internet site and these insights affect the acceptance and continued use of the software or websites.

This pilot study is focused on teacher and student users of websites and their subjective ratings of the websites. It appears from the initial findings that teachers' definition of usability differed. For example, because some of the teachers used a younger child's responses to the website, they may have rated the site lower than they would have if an older child had been used. Also because the teachers were part of a graduate class that integrated social studies and technology, some may have wished to please the instructors in their evaluation in order to receive a better grade. Additionally the context was a summer session class so the students used to respond to the websites were not in a classroom setting.

Also, each teacher was given a different site, so usability was determined through the lens of one teachers' view of the website. A future study might use more teachers to evaluate each website using groups of primary and upper elementary students in classrooms for each site. In this initial pilot study most of the students were older than kindergarten to second grade. The teachers, who asked young children to respond to the sites, universally found that the reading level even of those parts of the site designed for primary students was too difficult.

Significance of the Study

The increasing use of computers and access to the internet underlies the need for teachers to decide the usefulness and appropriateness of websites for instruction in all curriculum content areas, not just social studies. This study in particular emphasizes the need for teachers to evaluate the usability of websites for instruction before using them either as in class support for lessons or for independent use by students. The sites were created by or sanctioned by the United States government. Consequently judging the validity of the sites is not crucial to this study. Technological features, the other typical area of assessment, is crucial to this study, however. But the technological features alone cannot determine the usability for content instruction about the United States government in an elementary classroom. A close assessment of the content of the sites, how the content is presented and how acquisition of knowledge is

assessed is also important. Also important is whether the sites can be used independently by students to build social studies knowledge or if the assistance of a teacher is needed.

The nature of this pilot study needs to be refined and expanded, but even with limitations, this study sheds light on an under explored area of computer use and its integration into the elementary curriculum. Even when computer programs have been evaluated for classroom usability, they have tended to be software programs purchased for classroom use and not programs found on the internet. It is important for teachers to evaluate the increasing number of websites on the internet being accessed for content knowledge. Evaluation is important not only for their own instructional use but also as assistance to those individuals developing websites for student use, both elementary and secondary. Given the amount of money expended by the United States government to develop student pages on their government sites, it is important for teachers to assess the pages for effective instructional use in the classroom and provide feedback to the webmasters as a result.

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Appendix 1

Websites Used in the Study

Website	URL
FBI Kid's Page	http://www.fbi.gov/kids/k5th/kidsk5th.htm
White House Kids	http://www.whitehouse.gov/kids/
Kids in the House (of Representatives)	http://clerkkids.house.gov/
US Attorney's Kids Page	http://www.usdoj.gov/usao/eousa/kidspage/index.html
Safety Tips for Kids	http://www.mcgruff.org/
US Census Bureau American Fact Finders	http://factfinder.census.gov/home/en/kids/kids.html
National Park Service Web Rangers	http://nps.gov/webrangers/
Ben's Guide to the US Government	http://bensguide.gpo.gov/
Veterans Administration for Kids	http://www.va.gov/kids/
United States Patent and Trademark Office Kid's Pages	http://www.uspto.gov/go/kids/
Smithsonian for Kids	http://www.si.edu/kids/
America's Story from the Library of Congress	http://www.americaslibrary.gov/cgi-bin/page.cgi
Money Central Station	http://www.moneyfactory.gov/kids/start.html
The United States Mint Kids Page	http://www.usmint.gov/kids/flashIndex.cfm
NASA for Kids	http://www.nasa.gov/audience/forkids/kidsclub/flash/index.html
United Nations Cyberschoolbus	http://www.un.org/Pubs/CyberSchoolBus/index.shtml
Peace Corps Kids World	http://www.peacecorps.gov/kids/

Appendix 2
Teacher Ratings and Comments on Selected US Government Websites

	Website	Teacher Rating	Age Appropriateness & Reading Level	Interactivity	Content & Need for Prior Knowledge	Student Comment
1	**America's Story (Library of Congress)**	Good	3rd grade and above	Yes - baseball game and creating a cartoon activity Otherwise facts without much detail	Required prior knowledge of some vocabulary	(4th grader) Enjoyed games particularly the baseball game and creating a cartoon
2	**Ben's Guide to the US Government**	Very good	4th and 5th grade Not appropriate for primary grades	No comment by teacher		(2nd grader) Too hard
3	**FBI Kid's Page**	Very good 1.7	Upper elementary (3-6th grade)	Some activities needed to be printed, others were interactive		(3rd grader) Enjoyed games and learning that some crimes are difficult to solve
4	**Kids in the House (of Representatives**	Very good 2.2	3rd grade and above	Many interactive games but without feedback for the student or teacher	Needed prior knowledge of the Clerk's office to play games	(5th grader) Liked the games and learning how a bill becomes a law
5	**Money Central Station (US Mint)**	Good 3.0	Elementary grades			
6	**National Park Service Web Rangers**	Very Good 2.2	Different levels were correct for different age groups Level 1 worked well for a 6 year old	No comment	Dog activity that 6 year old enjoyed required prior knowledge of dogs	(1st Grader)
7	**NASA for Kids**	Very Good 2.2	Activities and games were leveled for elementary, middle and high school Reading level was appropriate for the level activities were designed for	Quizzes don't only tell student whether they are right or wrong but allow the student to try again		(4th grade) a lot of science content, some content was difficult but overall really liked the site particularly shuttle dog
8	**Peace Corps Kids World**	Excellent 1.0	Elementary all levels	The geography game had good information but student was only told	Excellent on information about the Peace Corps	

				if the answer was right or wrong – no further clues		
9	**Safety Tips for Kids**	Very Good 2.0	Should be used with 4th or 5th grade	Needed adult attendance to monitor progress	Related well to child's life Used a set of scenarios on safety and student was asked to respond	(6th grade) Liked safety tips for riding a bike and how to deal with strangers
10	**Smithsonian for Kids**	Excellent 1.3	Upper Elementary	For younger children a matching game and coloring book – for older students and zoo webcam		(4th grade)
11	**United Nations Cyber School Bus**	Good 3.0	Difficult even for upper elementary 5th and 6th		Learned about the flags of the world but did not understand the peace objective of the UN	(5th Grade)
12	**US Attorney's Kids Page**	Poor 4.0	Vocabulary was difficult for 5th grade	Mostly text – no interactive activities	Information would support a teacher created lesson but not good for independent student use – some links are to adult information (sex offenders)	(5th Grade) Did not like the site
13	**US Census Bureau American Fact Finders**	Very Good 2.0			Can click on each state and get information for that state	(Upper Elementary) Excellent for geography
14	**The United States Mint Kids Page**	Poor 3.8			Not a lot of information for social studies content	(6th grade) Better for younger grades
15	**The United States Patent and Trademark Office Kid's Page**	Good 2.7	Needs a lot of teacher guidance Difficult for young students	Matching games did not help in content learning, but inventor IQ game did	Mostly text and photographs Good information on inventions	(4th grade) liked games and information on inventions
16	**Veterans Administration**	Good	No differentiation between	Series of games and art	Objectives not clear –	(5th Grade)

	for Kids	3.3	grade levels	activities Links are better for interactive activities	links provided more information	Enjoyed games but did not learn much about the VA
17	**White House for Kids**	Very good/Good	Best for upper elementary	Comprehension quizzes and math components		(2^{nd} grade) Enjoyed matching game and learning about pets in the White House