Usability of Websites for Children:
70 Design Guidelines

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Executive Summary

Millions of children use the Internet today, and millions more are coming online every year. Many websites target children with educational or entertaining content, and many mainstream websites are adding "kids' corners" with sections intended for children — whether as a public service or to build brand loyalty from an early age.

Despite this growth in users and services, very little is known about how children actually use websites and how to design sites that will be easy for them to use. Most kids' websites are based on pure folklore about how kids supposedly behave — or at best, on insights gleaned from observing the designers' own children, who are hardly representative of average kids, typical Internet skills, or common knowledge about the specific Web project.

Testing How Children Use the Web

The findings in this study are based on usability testing with 55 children, who varied by age (grades 1–5) and by country of origin. We tested in two countries to broaden the international applicability of our recommendations.

We observed these children interacting with 24 sites designed for children, as well as three mainstream websites designed for adult users (Amazon, Yahoo!, and Weather.com). The kid-specific sites, such as Alfy, MaMaMedia, and Sesame Street, directly target children, but we also tested several kids-oriented sub-sites produced by mainstream companies, such as ABC News for Kids and Belmont Bank's Kids' Corner.

Even though participants in our study were very young, they often had the greatest success using websites intended for grownups. Sites such as Amazon and Yahoo! that are committed to utter simplicity and compliance with Web design conventions have become so easy to use that they support little kids very well. In contrast, many of the children's sites had very complex and convoluted interaction designs that stumped our test users. As one first-grade boy said, *The Internet is a lot of times BORING because you can't find anything when you go on to it."*

Usability Problems Hurt Kids

It is a common myth that children are masters of technology who can defeat any difficulties when using computers. Our study found that children are incapable of overcoming many of the usability problems in current websites, however. Also, many aspects of poor usability caused children to leave a website because they did not have the patience to prevail in the face of complexity. A fourth-grader said, *When I don't know what to do on a web page, I just go look for something else."*

Children don't like slow downloads any more than adults do. As one first-grade girl said, *Make it go faster! Maybe if I click it, it will go faster..."*

Young children often have hand-me-down computers, whether at home (the machine used by the parents before they got a new model) or at school (where budget constraints mandate keeping machines in service for many years). Kids also often have slow connections and outdated software. These limitations make it essential for websites to avoid technical problems or crashes when accessed by low-end equipment. When faced with an error message, the typical kid in our study told us that it happens a lot, and you just have to ignore it. According to our users, the best thing to do in these cases is to close the window and find something else to do.

We found many instances of classic web usability problems that caused difficulties for the kids in our study:

- Lack of clear navigational confirmation of the user's location, both within sites and when leaving them, confused users.

- Inconsistent navigation options, where the same destination was referred to in different ways, caused users to visit the same feature repeatedly, because they didn't know they had already been there.

- Non-standard interaction techniques made it impossible for users, for example, to select their preferred game using a "games machine."

- Lack of perceived clickability affordance caused users to overlook features, because the visual design required users to click an overly flat-looking graphic to access them.

- Fancy wording instead of straightforward language in interfaces confused users and prevented them from understanding the available set of choices.

Age Appropriate Content

Young children are beginning readers and have problems dealing with large amounts of text. We observed severe usability problems when kids were inadvertently thrown into sections that were written at a different level than their current reading skills.

Kids are keenly aware of their own age and differentiate sharply between material that is appropriate for them and material that's for other kids who may actually be quite close to their own age. As a first-grader (a six-year-old) said about one website, *This website is for babies, maybe four or five years old. You can tell because of the cartoons and trains."*

Differences Between Children and Adult Users

We discovered a large number of cases in which our usability findings for kids differed from the results we usually get when testing with adult users. Some of the more striking differences were:

- Animation and sound effects were positive design elements for children, often helping create a good first impression that encouraged users to stay with a site.

- Children were willing to indulge in mine-sweeping behavior, where they had to scrub the screen with the mouse in order to find clickable areas or to enjoy the sound effects played by various screen elements.

- Geographic navigation metaphors worked, in terms of presenting the kids with pictures of rooms, villages, 3-D maps, or other simulated environments that served as an overview and entry point to the various features of a site or sub-site.

- Children rarely scrolled pages and mainly interacted with the information that was visible above the fold. (This behavior was also observed among adult web users in 1994, but more recent studies have found that adult users tend to scroll web pages these days.)

- Half of our users were willing to read instructions; indeed, they often preferred to read a paragraph or so of instructions before starting a new game. In contrast,

most adult users hate instructions and try to use websites without having to read about what they are supposed to do.

Most of these differences are related to the differences in the online activities of children and adults. Younger children use the Web mainly for entertainment, although older children also use it for schoolwork and for communication. These uses encourage many types of design elements and multimedia effects that are less appropriate for business settings and most of the online activities of adult users.

Advertising Works

The most notable finding in our study was that children click the advertisements on websites. Unfortunately they often do so by mistake, thinking ads are just one more site element. In nine years of testing websites with adult users, the number of advertising clicks we have observed can be counted on the fingers of two hands, but kids click banners. They cannot yet distinguish between content and advertising. On the contrary, to the kids, the ads are just one more source of content. If a banner contained a popular character or something that looks like a cool game, they clicked it. *Pokémon, here we come.* (Kids clicked even though these graphics were not an editorial link to a Pokémon site but just an advertiser who was featuring a Pokémon character in a banner ad for something else.)

We strongly recommend that parents, educators, and other caretakers spend time with children to acquaint them with the realities of Internet advertising and teach them how to recognize ads. Many people already help their children understand and cope with television commercials, but Web ads seem to have been overlooked in most of these educational efforts — possibly because most adults would never dream of clicking an ad on a website. Adults don't view Web ads as a big issue because they have trained themselves to tune out the ads subconsciously through *banner blindness*, which continues to operate for adults even when visiting children's sites.

Many of the websites in our study tried to differentiate editorial from advertising by marking the banners with "AD" or "PAID." This tactic didn't work. The kids in our study didn't notice these subtle markers but were attracted to the colorful characters and games in the ads.

Gender Differences

We found bigger differences between the boys and girls in this study than we usually find between men and women when testing with adult users. Boys were significantly more annoyed by verbose pages than were the girls, possibly because boys are not as accomplished as girls at reading at the ages we tested. In contrast, the girls complained much more than the boys when sites lacked good instructions. The boys spent more time alone with computers, and the girls spent more time using computers with a parent.

Despite the differences, most of our conclusions regarding good web design for kids hold equally true for boys and girls. Most of the issues relate to human-centered use of technology and age-appropriate design and not to gender differences.

We strongly recommend that anybody who plans to run usability studies with children make substantial efforts to include about the same number of boys and girls. When studying adult users, we always try to include reasonable representation of both genders, but it is not essential to make the numbers identical. Men and women sometimes differ in the types of content that interest them, but in terms of

interaction design, the big issue for adult users is bridging the gap between humans and computers and not how to accommodate the comparatively smaller differences between the genders. For kids, the differences are bigger, so the need for a balanced set of test participants is greater.

Cool Content, Simple Interaction

Children want content that is entertaining, funny, colorful, and uses a good deal of multimedia effects. The user interface, in terms of homepage design and navigation systems, should get out of the way and allow the kids to get to the content as simply as possible. Children enjoy exploration and games, but it should not be a challenge to operate the website itself. The content should be cool, but the design has to provide great usability or the kids will leave.

Web Design for Kids Today

Because very little has been published to date about kids' Web usability, we conducted an exploratory study to uncover the fundamental issues today for kids on the Web. This report is a summary of our findings, and it is intended for anyone interested in creating a good online user experience for kids.

The report surveys the current state of Web design for kids and explains some of the high-level issues. Guidelines are next, in a tear-out list. Then we present a discussion of each guideline and specific issues found. Finally, discussions about our users, their computing environments and experience, and tips for doing your own testing conclude the report.

In two phases, we tested 24 websites that varied in content and use of the Web, with 55 kids as users. We tested these sites with a wide variety of young users. They varied by age, (grades 1–5, or ages 5–11), by country of origin (United States and Israel), and by gender. In the USA, 39 users tested websites, and 21 tested sites in Israel. The American kids tested American sites, and the Israeli kids tested both sites in Israel (in Hebrew) and sites from the US (in English).

The study sessions took place in various settings — school, home and usability lab. We chose a variety of sites from the leading children's genres that featured a number of interaction possibilities. Some sites had more multimedia and others were more text-based. All had games and activities. Each age group used age-appropriate websites.

In addition, we also tested some sites for general audiences with older users (grades 4–5). We chose sites that adults find easy to use, according to other user studies: weather.com, Yahoo! and Amazon. There, kids were asked to perform tasks relevant to all users.

Those who are developing sites for children can use our list of guidelines to avoid the major pitfalls, but user testing is the only way to be sure kids can use your site. For that reason, we've included extensive information to get you started on usability testing with children.

WHY LOOK AT USABILITY FOR KIDS TODAY?

Moving Target

Researching the Web experience of kids is like trying to hit a moving target. The characteristics of kids using the Internet change constantly. As kids mature, new groups of kids with knowledge of different media replace them. Experience online has been found to be the most determining factor regarding online behavior, more than age, gender and socioeconomic status[1]. Currently, an estimated 65 million children between ages two and seventeen have access to internet at home in Europe and the US, and their numbers are rising at a rapid rate[2]. The Web experience offered for kids also changes constantly — designers are becoming more experienced in Web

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[1] "Demographics for Kids on the Internet," Peter Grunwald for the "E-kid Power" conference, 2001.

[2] Datamonitor, July 2001.
http://www.datamonitor.com/~790c2f61900a4319a8b6365dc6fe6497~/all/news/single_comment.asp
?pid=604C63CB-A620-4A84-A2F3-261B356818C9&cat=CommentWire

design for kids, and updated design and interaction trends. In addition, technology changes constantly — networks get faster, processors become more powerful, screens grow, and input devices multiply. Understanding the intersection of these website factors at a particular point in time is challenging. All of these factors may influence and change kids' user experience for better or for worse.

What can we learn despite these ever-changing circumstances? There are certain elements in the users' Web experience that remain constant. Human-computer interaction behaviors do not change as drastically as other factors. Similarly, children's mental models, reading levels, ability for abstract thinking, and automatic behaviors at a certain age remain much more constant over time.

Usability As the Gateway to Content

> *"Children tend to have an advantage over adults; their curiosity is like a constant beam that highlights and invests with interest anything within range. The object need not be useful attractive or precious; as long as it is mysterious it is worthy of attention."*

M. Csikszentmihalyi, 1997[3]

Children's activities and content preferences often appear illogical and spontaneous. Thus, many adults conclude that most kids are impulsive and irrational and that they seek only immediate thrills without any thought to consequences. Although kids often act creatively on their curiosity, experiences like disappointment and dissatisfaction can discourage them from trying something again.

Unlike adults, children do not use the Internet to look for the most efficient way to compare and buy stereos, for example, or the best price for an airplane ticket. These practical tasks are *not* in their realm of interests. Instead, kids want to look up their favorite pop star or sports idol. But, even if their goal is *not* useful, attractive or precious, they still want to get the information they seek when they go to a website. If their interaction with a mysterious, alluring interface keeps resulting in error messages, they'll leave and perhaps never come back. Therefore, websites for children must be easy to use.

Quality content has always been the chief motivator for an individual's use of any medium. Books, movies, TV programs, and video games succeed in attracting audiences if their content is engaging, moving, exciting, and novel. Designing websites for kids is based on the same premise. If a website has stimulating content, young users may be motivated to stay and explore the site.

Why be concerned then with the usability of a website if the content is what's important? One of the main problems in providing quality content for children's websites is a lack of resources causing deficiencies in technological and visual design. This shortfall means that even though a website could have a cutting-edge curriculum, radical educational benefits, and exposure to a whole new social environment — users might never discover those features. Many otherwise high-quality websites will never reach their audience unless they focus also on making the user interface easy for kids.

Usability and user experience research serve as the gateway to high-quality content. By designing websites according to the guidelines in this report, designers allow

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[3] "Creativity: Flow and the psychology of discovery," M. Csikszentmihalyi, 1997.

users to focus their energy more on the content of the Web experience, rather than on how to get to that content.

CONTEMPORARY DESIGN

Design Myths

Many designs for kids in various media — TV, books, movies, video games — have been based on myths regarding what kids love and what is easy for them. Most of these myths have not been tested with children, but are a projection of adults' visions about kids' preferences. Although many of the more traditional industries (toys, clothes) do include market research in their design process, often interactive designers take adult media content and attempt to make it *childlike,* simply by transforming those design elements that are believed to be less 'child friendly'.

In this project we searched for design myths for websites geared toward children, and tried to determine whether or not designs based on these myths actually worked better for children when they used the sites.

There are a few main myths surrounding children's website design:

- Content for kids should be simplified and less sophisticated.
- Visual design and multimedia should be added wherever possible.
- Kids are as Web savvy as adults; therefore, they understand technical terminology, sometimes even more than their parents understand it.

We found that some of these myths did not hold true. We address them throughout this report to determine their proximity to reality and their relevance to young users of websites.

Current Genres in Children's Web Design

The websites chosen for this study were selected from the main genres found in websites for kids today. These site genres have developed from various disciplines, and therefore have different emphases.

Collections of games

These websites consist of a general homepage that presents various categories of games, often gathered from diverse sources. The games vary from minimal shoot-'em-up games to educational activities. Usually, the games have no single overall theme because they are products of several development teams.

Collections of games was one of the earliest Web genres. Designers gathered relevant games from websites for adults and put them together in a website for children.

Kids were familiar with this structure, and treated it in many ways like a video-game arcade. They would find a category that appealed to them and then start clicking on the games.

Examples:
www.bonus.com
www.alfy.com

Specific content worlds

These websites present users with information and activities on a specific topic or subject, such as wildlife or space. The topic is the main theme throughout the website. Often these websites offer various activities around this content world: articles, games, community interactions, contests, and polls.

Generally, the designers of *specific content worlds* are subject matter experts and members of topical groups. Their goal is twofold: to increase awareness and involvement for their topic, and to provide a fun learning experience for the kids.

Kids usually recognized this genre from looking at the homepage and made a quick decision — if the topic presented interested them, they stayed and tried everything. If it did not, they didn't even check out the games.

Examples:
http://yucky.kids.discovery.com
www.spacekids.com

Educational websites

Unlike *specific content worlds*, the *educational website* usually originates with educators. These sites offer a number of activities and games that relate to school curriculum and to homework subjects, such as math, English, social studies and art education. In many cases a given website includes a variety of topics. These websites often have lower production values than commercial sites, because they are sponsored by non-profit organizations or are created by individuals, and thus have fewer resources.

Kids varied in their responses to this genre. While some dismissed anything related to school, others tried to find content related to material that they have learned. For example, if a child is good at multiplying numbers, he or she can easily get a high score in a multiplying game. This success can motivate the child to stay at the website.

Examples:
www.funbrain.com
www.galim.org.il

Children's brands

This genre consists of Web adaptations of children's brands present in other media. Originating in TV, books and video games, these brands create a Web presence to complete their branding world. Like the *specific content world*, these websites offer various activities somewhat related to their brand. *Children's brands* sites usually have high production values and often sell additional branded items.

Kids treated these websites as *specific content world* websites. If they liked the brand, they got excited and looked for interaction opportunities. If not, they left the website immediately. Children did not distinguish between the offline and online brand. Rather, they made inferences from one to the other in terms of quality and storyline information.

Examples:
www.wonka.com
www.sesamestreet.org

Adult brand subsidiaries

A new genre gaining popularity is the kids' section of general-audience websites. Adopted from newspaper and magazine special sections for kids, these sub-sites present a kid-friendly version of up-to-date general content. Websites in this developing genre offer very diverse qualities of information and interaction.

Kids' reactions to this genre varied. Some recognized the brand while others did not and were unsure what they would find on the website. If content that interested them was available, sometimes they explored it. Also, if games were available, sometimes they checked them out as well.

Examples:
www.sikids.com
www.whitehouse.gov/kids/

Information and search portals

These websites (known as *portals*) consist primarily of lists of links to information on the Web. Adopting the adult model, they allow kids to look up information in which they are interested, using a kid-friendly interface, and often producing kid-friendly results. *Information and search portals* are mainly textual and usually do not generate original content.

When kids wanted information, they used these websites. Their satisfaction depended on their success — how fast they found what they were looking for and the quality of information they found.

Examples:
www.yahooligans.com
www.kidsclick.org

Kids on the Web

Why Kids Use the Internet

In the United States alone, the number of children using the Web is expected to reach 44 million by 2005. The estimated number of American kids online has grown from 8 million in 1997 to 19 million in 1999 to 30 million in 2002. Kids use the Web mainly for entertainment. Although some kids use it for homework research and school related projects, the majority of our users approach the Web for entertainment. From games to information about their idols and hobbies, the Web is a source for leisure activities. Most kids do not use the Web for other reasons, such as communication, e-commerce and planning. This usage may change though, as the Internet becomes more integrated in more children's lives.

Many kids made a hard distinction between using the Internet and using CD-ROMs. Users said the Internet was for gathering information, while CD-ROMs were for playing games. Some users preferred CD-ROMs over online games because CD-ROMs have higher production values and usually more complex interactivity. Other kids said they prefer playing online because of greater game variety — at home the number of CD-ROMs they have is limited. So children understand the Web as an information medium, and they turn to websites when they want to obtain information or to enjoy new and more diverse activities.

ONLINE BEHAVIOR

What Kids Do First

Often, according to the parents and children in our study, adults assist children in connecting to the Internet. Even if later they left kids to surf as they pleased, parents usually guided their kids to a Web starting point. This starting point was usually either a kids' portal (such as Yahooligans!) or a specific kids' website. When children want to search for information, many parents search with them, using general-audience search engines. Then they look through the search results until they arrive at the sought-after website. Some young users had kid-friendly browsers that allowed viewing only so-called child-safe websites[4]. When caretakers were comfortable with the safety of tools and content, children were allowed to conduct searches by themselves. (More information about Web safety on page 123)

Parents and children in our study reported that after arriving at the desired website, children were often allowed to continue on their own, scanning the homepage for interesting content. Once they saw something meaningful, they'd click it and try to figure out what it is. Whether they were searching for information or wanted to play a game, when children didn't understand the content in a few seconds, they went on to look for something else. Kids understand that the Internet contains a vast amount and huge variety of content, and therefore if the activity isn't almost immediately apparent and satisfying — they look for something else that is. Rarely do kids stay and try to figure out a how something works. When they do take the time to struggle

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[4] "Child-safe" denotes an often too-broad attempt to block troublesome terms using a database of blocked sites. Databases vary widely among vendors.

with a feature or control, it is usually because the content is very unique or extremely attractive.

Interactivity

Children love interactivity. The idea of influencing the medium and receiving immediate feedback was very attractive to them in our study. Interactivity can be anything from full- fledged games to smaller activities, such as polls, quizzes and community features. Kids enjoy making their mark on websites — posting thoughts and art work, creating riddles for others, and entering contests. Online gaming has been very successful in attracting young audiences, because it offers many different levels of interaction simultaneously.

There are a number of pitfalls to adding interactivity to websites. The main one is the interface design. Interactive activities are usually more complex than static content presentation and therefore include more features, abstract affordances[5], and controls. In order to make the user's actions very simple and apparent, designers must make sure the interface reflects the objective of the interaction. (More about interface design on page 51.) If the interface is very complex, users may leave in frustration after failing to complete the activity.

In addition, network performance can undermine good interactivity. Often interactive features add to the size of web pages, making them load and react more slowly over the Internet. This sluggishness can degrade the whole user experience and may result in users never even getting to the activities. When adding interaction to a website, designers must take this factor into consideration and design both the interaction and the site to minimize the performance effects.

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[5] Affordances – "the perceived and actual properties of the thing … that determine just how the thing could possibly be used." (From *The Design of Everyday Things*" by Don Norman, New York: Doubleday, 1990.)

Checklist of Design Guidelines

This checklist summarizes the guidelines derived from our study, which are discussed later in this report in context. Throughout the report the guidelines are numbered accordingly, and appear in boxes like this.

GENERAL INTERACTION

1. **Buy common misspellings of your domain name**.
   Pornography sites probably will, if you don't. (Discussion begins on page 14.)

2. **Adhere to the principles of good design.**
   When designing for kids, follow the basic good design rules you use when designing for adults. A website does not have to be childish in order for kids to use it successfully. (Discussion begins on page 21.)

3. **Design for no scrolling.**
   Fit information on a page viewed at 800 x 600 resolution. (Discussion begins on page 23.)

4. **Use standard interaction schemes.**
   Use well-known navigation and interaction methods that are common on other websites or are ubiquitous in the physical world. (Discussion begins on page 24.)

5. **Use standardized forms.**
   Design form structure and widgets in the most simple and standard way. Most kids on the Internet today have an understanding of basic Web concepts, such as filling out forms and using passwords. (Discussion begins on page 26.)

6. **Avoid members-only features.**
   We found most kids aren't allowed to become members. Carefully consider whether to offer memberships on your site at all. If you do offer exclusive features, consider which information should be accessible for members only, because most of your audience may never see them. (Discussion begins on page 27.)

7. **Don't ask kids for personal information that can endanger their privacy on the Web.**
   Encourage them to protect their personal information, for example: tell them to invent "screen names" instead of using their real names. (Discussion begins on page 28.)

8. **Create immediate success.**
   Make it easy for kids to find what they want on their *first attempt.* (Discussion begins on page29.)

9. **Make sure every feature is high quality and works well.**
   It is better to have fewer features that all work perfectly, rather than include some that are mediocre or difficult to understand. Negative experiences cause users to form a bad impression of the entire website. (Discussion begins on page 29.)

10. **Provide explicit directions**.
Tell the user exactly what to do, right on the screen. (Discussion begins on page 30.)

11. **Use icons and symbols in familiar ways.**
Match icons' design to their meaning in the physical world. (Discussion begins on page 32.)

TEXT

12. **Use simple, relatively large fonts.**
Text fonts on screen should be comparable in size to at least 12-point print type (when viewed on the target audience's most common screen resolution). Provide good contrast between the text and the background. Contrast is especially important for beginning readers and those who are reading a second language. (Discussion begins on page 34.)

13. **Place text on solid backgrounds.**
Avoid putting text on background images, especially if they are dynamic. (Discussion begins on page 35.)

14. **Do not use animated text.**
Using animation or other special effects on text causes problems when it is too slow or too fast, or when objects and text are superimposed. If you must animate text, let users control the pace. (Discussion begins on page 36.)

15. **Use easily understandable and succinct text only.** Minimize the amount of text on screens. (Discussion begins on page 37.)

16. **Maintain a consistent readability level.**
Make sure that text on all pages and activities consistently reflects users' expectations and reading capabilities. (Discussion begins on page 39.)

17. **Distinguish and isolate content for adults.**
When content on a children's website is aimed at adults (and thus requires a different level of readability), design the interface so that young users will not accidentally encounter it. (Discussion begins on page 42.)

18. **State clearly to users that they have reached an adult section.**
Present a straightforward and easy way back to the kids' content and activities. (Discussion begins on page 43.)

19. **Add short and unambiguous textual instructions and directions.** About half of your users depend on text to explain the website's activities. (Discussion begins on page 45.)

20. **Provide instructions that are always accessible.**
Place easy-to-find links to brief text explanations wherever the user might need or want instructions.(Discussion begins on page 47.)

21. **Help inexperienced readers by supplementing text with other kinds of explanation.**
Don't rely solely on text when designing instructions for beginning readers and international users. You may provide directions using other media, such as diagrams, animation, and sound. (Discussion begins on page 47.)

MULTIMEDIA

22. **Design multimedia for your audience's connection speed.**
Research your potential users' technical environment. Use animation in your design ONLY for users who have a high-speed Internet connection. Flash movies over a modem or similar connection caused frustration that usually resulted in users skipping the animation or clicking the Back button. (Discussion begins on page 49.)

23. **Use motion and sound to attract kids' attention and engage them.**
Kids find animation and sound extremely engaging. Use animation as a way to focus users' attention on important elements on the screen. Make sure that the animation does not interfere with the element's functionality. (Discussion begins on page 51.)

24. **Show users the status of multimedia downloads and playtimes.**
Present progress to completion, how much time or file size remains for downloads, and how long it takes to play the actual multimedia clip. Tell the user about stalls or interruptions so they can make an informed decision about the rest of their session. (Discussion begins on page 51.)

25. **Allow the user to control the multimedia clip.**
Provide an explicit skip feature (such as a "skip" button) for all Flash movies. Use familiar keyboard controls (such as ESC) to allow the user to pause, skip and play the movie. (Discussion begins on page 52.)

26. **Make intro animations short and interesting.**
Animations that are short (10 – 20 seconds) and meaningful (funny, surprising, intriguing, and so forth) work best. Boring intros or long waiting times can cost you your audience. (Discussion begins on page 53.)

27. **Use passive animation while downloading large game files.**
Add simple, fun animations to hold users' attention while loading large files. Using interim interactive games for this purpose is not recommended. If you do use games, provide effective feedback to signal download completion. (Discussion begins on page 55.)

28. **Avoid automatic Flash replays.**
Avoid both re-downloading and re-running Flash movies that users have already seen or skipped (such as homepage interfaces or intro clips). (Discussion begins on page 55.)

29. **Provide non-multimedia content alternatives.**
Provide both a Flash and non-Flash entrance to the website or web page. (Discussion begins on page 57.)

30. **Use background music for ambience but give control to the users.**
Consider using background music when designing for kids, but give them an easy way to control volume or to stop the music at any time. Kids enjoy cheerful background music — but want the option to turn it off at any point. (Discussion begins on page 57.)

31. **Do not disrupt users with sudden loud sounds or music.**
Abrupt changes in the users' environment can be jarring. Turn up sound gradually and allow immediate user control of mute and volume. (Discussion begins on page 58.)

32. **Make the audio visible.**
Add visual representation for the sound on your site. Users might be unaware that they need to turn their speakers on. (Discussion begins on page 58.)

33. **Use music that is popular and familiar to your target audience.**
Kids get excited when they hear music they know. (Discussion begins on page 59.)

34. **Use sound to supplement and enhance the interaction.**
Do not rely solely on audio rollovers and sound effects for important navigation. Adding audio rollovers provides an experience enhancement that kids enjoy, especially if the sounds are funny. (Discussion begins on page 59.)

35. **Consider using rollovers for narration.**
Add rollovers for audio narration and instructions if your target users are unable to read or are in the initial stages of reading. Record short (a few seconds) of clearly audible and understandable audio clips in age-appropriate language. (Discussion begins on page 59.)

36. **Don't depend on audio to explain navigation.**
Provide navigation that is independent of audio. The navigation structure and tools on the site need to be understandable to users without audio instructions. Often audio files download too slowly, and users make navigation decisions before hearing them. (Discussion begins on page 59)

NAVIGATION AND SEARCH

37. **Use standard navigation and search schemes.**
Many kids are familiar with these conventions and use them easily. (Discussion begins on page 60.)

38. **Provide constant access to the search feature.**
Every content page should have a search box. Inside an activity, there should be at least a link to search available at all times, in a consistent location. (Discussion begins on page 62.)

39. **Create meaningful category names.**
Use informative titles for category names, rather than vague or trendy words. (Discussion begins on page 62.)

40. **Design search results to inform users about the website's content structure.**
Help users learn how to browse your site by showing the relevant content categories for each item in the search results page. (Discussion begins on page 64.)

41. **Do not use more than two navigation levels or schemes.**
Too many navigation systems in one website create confusion. (Discussion begins on page 66.)

42. **Do not design interface elements to have more than one intended function.**
Each interface element should have only one function, otherwise users get confused. (Discussion begins on page 67.)

43. **Present noticeable** "you **are here" feedback to users.**
Show users where they are in the website structure (homepage, category,

activity), and where they can go. Make it easy to understand how to move around within the site. (Discussion begins on page 69.)

44. **Do not remove standard navigation tools from the browser window.**
Kids depend on these tools and get frustrated when they can't use them to control their web experience. (Discussion begins on page 70.)

GRAPHICAL USER INTERFACE

45. **Present the breadth of the website's content on the homepage, to achieve a true initial impression of what the site has to offer.**
The homepage should give an overview of the website without creating any false expectations. (Discussion begins on page 71.)

46. **Use precise and unequivocal labels.**
Define and distinguish interface objects by using concrete and plain language, so users can predict exactly what they will get by clicking them. (Discussion begins on page 75.)

47. **Make clickable items look clickable.**
Add visual affordances of clickability to interactive images and links. Make the distinction between clickable and non-clickable items clear. (Discussion begins on page 78.)

48. **Add simple visual rollovers to images that can be clicked.**
Graphic rollovers serve as cues to users that an item is clickable. (Discussion begins on page 79.)

49. **Design text buttons to look pushable.**
Make clickable objects three-dimensional, and use that visual cue consistently. Visual affordances that mimic real-world controls are extremely powerful with kids. (Discussion begins on page 81.)

50. **Beware of promotional elements that are too distracting.**
Users might never make it into your website. (Discussion begins on page 85.)

51. **Distinguish advertisements from content.**
Create a visual context for promotions and banners. (Discussion begins on page 87.)

52. **Mark the exits.**
Warn users when they are about to leave the site, and distinguish your content from others. Explain how to return to your website later. (Discussion begins on page 87.)

53. **Match advertisers closely with your site.**
Present only promotions relevant to the site's content and goals, because the ad's content will be perceived as the website's content. (Discussion begins on page 88.)

SYSTEM ERRORS AND HELP

54. **Integrate Help with the content.**
Most user assistance should be included in the main content of the page. Do not rely only on a separate Help section to inform users. Users sometimes search for information that is in a Help section, so make sure your site search also searches Help content. (Discussion begins on page 90.)

55. **Explain navigation schemes in the Help section.**
Help should not be only about content, because some users look in Help for assistance with using the website features. (Discussion begins on page 90.)

56. **Don't assume users have any technical understanding.**
Don't assume kids know subtle conventions, such as the difference between OK, Close and Cancel. (Discussion begins on page 91.)

57. **Minimize the potential for technical errors.**
Decrease the number of errors and error messages. Users lose patience and appreciation for the website when they experience errors. (Discussion begins on page 91.)

58. **Use terms that non-technical users understand.**
Kids do not understand technical terms such as plug-in names and connection speeds. (Discussion begins on page 91.)

59. **Do not offer to change the user's settings permanently with dialog boxes, pop-ups, or alerts.**
Customization can undermine trust when it's done without user understanding. (Discussion begins on page 92.)

60. **Design interactive dialog boxes so they will not be dismissed automatically.**
Examples: pop-up windows, error messages, download alerts, and customization alerts, which ask users to make a real choice, should be phrased in language and terms users understand. (Discussion begins on page 93.)

61. **Accommodate a low-tech audience.**
Do not use nonstandard or recently released features (such as plug-ins) in your design if your users probably don't have the necessary software. (Discussion begins on page 94.)

62. **Automatically detect the presence or absence of plug-ins.**
When that is not possible, design the entry page so it will be easy for the user to understand which option they should click to continue. (Discussion begins on page 95.)

63. **Provide alternative content for users lacking necessary plug-ins.**
Add an explanation for users who do not have the necessary software and offer them alternative content. (Discussion begins on page 96.)

CONTENT

64. **Research your target users' contemporary interests and match your website content to those interests.**
Present content that relates to the current trends in your users' age group generally, and aim for your target users' interests specifically. (Discussion begins on page 96.)

65. **Address your users' age in a direct manner.**
Simply indicate which age group the site is for. For example, provide entrances (and features) for each age group, or explicitly state the targeted age group for your site. Use images, design and content that convey suitability to their age group. (Discussion begins on page 97.)

66. **Address users' intellectual curiosity with stimulating content.**
Play to users' curiosity and intelligence. Boost users' motivation to explore your website with sophisticated content. Kids look for interesting content and intriguing interactivity. (Discussion begins on page 98.)

67. **Keep content current.**
Users expect websites to be updated frequently, in terms of both content and design. (Discussion begins on page 99.)

68. **Design characters that kids can identify with.**
Kids are attracted to characters in general, especially when they are popular and funny. (Discussion begins on page 100.)

69. **Allow users to control or interact with characters.**
Kids enjoy the ability to influence various characters, and will seek out all the ways they can interact with them. (Discussion begins on page 101.)

70. **Have characters address the users directly.**
Allow characters to speak to users and create an opportunity for conversation. (Discussion begins on page 102.)

Design Guidelines in Depth

GENERAL INTERACTION

Getting To Your Website

As mentioned previously, many kids use search engines to find the sites of their interest. Kids who have heard the name of a website or who are familiar with the site may go directly to it by typing the website's address into their browser, however.

During the preparation of this report, we accidentally typed a misspelled URL for one of the kids' websites into a browser. A pornography site appeared! It is increasingly common for domain squatters to buy misspelled (or expired) domain names and to charge a lot to for site owners to buy them out.

> 1. **Buy common misspellings of your domain name**.
>   Pornography sites probably will, if you don't.

Although it is not practical to buy every permutation of a domain name, it is prudent to buy the most commonly mistaken names and to create short domain names that are not likely to be misspelled. For example, Barnes and Noble also bought bn.com to make their site easier to find and their name harder to type wrong by mistake.

Kids' websites should be very careful about avoiding this problem, because kids probably make more spelling and typing errors than adults do, and the consequences of even accidentally arriving at a porn site may be quite severe (for example if it happens in a school classroom).

Simplicity and Standardization in Design

> 2. **Adhere to the principles of good design.**
>   When designing for kids, follow the basic good design rules you use when designing for adults. A website does not have to be childish in order for kids to use it successfully.

Some design components are similar for kids and adults. When websites are simple and designed for general ease of use by adults, kids will find them easy to use as well. We found that following the basic guidelines for adult users proved successful for children also. Easy-to-use navigation, a high-quality search engine, simple and focused content design, and consistency all contributed to a positive user experience on websites for kids. They did not have to be designed down for children. In fact, some general audience websites were easier for kids to use than were the websites designed especially for kids.

Kids in our study told us about helping their mother or father find information on the Web or showing their grandma what she wanted to know. They clearly had been exposed to websites for adults and to the general Web user experience. Many reported using Yahoo! to find information, either on their own or with their parents.

> *"Oh, adult websites are easy! I use AskJeeves by myself all the time. You just write a question — and it answers!"* (Fourth-grade boy)

We asked some fourth graders[6] to find information on websites designed for adults. We chose websites with general content that were above average in their usability design based on tests conducted with adult users. Users were asked to perform tasks relevant to both them and adult users.

On Amazon.com, we asked kids to find information on the new *Harry Potter* books. All of the kids given this task were successful. They used two methods to find their item — navigating through categories or searching (more about navigation on page 60). Although Amazon was not designed specifically for kids, its overall usable design provided a rewarding Web experience for our users of all ages.

At Weather.com, kids were asked to find the weather forecast for later that day in their hometown. Most of our users succeeded in this task, either by using search and typing in their hometown's name or by browsing various regions and narrowing down results to find their city.

Weather.com displays a big map image on its homepage, which can distract users' attention from finding their local weather forecast. Two users were immediately attracted to the map, and started clicking on it in the relevant geographical location to find the information. Clicking to navigate proved problematic, because being precise was difficult, and the information presented was not the information they sought. In this case, the good design features were equally useful for adults and kids, and the bad design feature was equally distracting.

Weather.com had distracting design elements
(such as the map image),
which had the same negative influence on both children and adults.

Kids and adults use the Web differently from each other and exhibit different behaviors when confronted with similar situations. Factors ranging from concrete thinking skill to reading level create differences in younger users' behavior.

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[6] Children in fourth grade at schools in the US and Israel are typically 8 or 9 years old.

These differences occur with scrolling, for example. Although a few years ago many adult users did not scroll beyond the initial screen of content; today many do. The majority of kids in our study, however — especially the younger kids — did not scroll at all, even when it was evident that content was missing.

> 3. **Design for no scrolling**.
>   Fit information on a page viewed at 800 x 600 resolution. Do not design so that children must scroll to see more page content.

On a number of websites, users in our study did not scroll down beyond the initial screen of content that was presented to them. Even when scrolling could have helped them complete their task or find the information they sought, they didn't scroll.

For example, on Alfy.com, one game did not fit on the screen. Users (first-grade[7] boys) had to scroll down to view the entire game. At first they did not scroll at all. After a while, when lack of scrolling interfered with their playing, they tried to scroll and play at the same time. Users had difficulty playing and became frustrated.

Users kept the top of the page in place while playing the game, missing all the information that didn't fit in the screen.

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[7] First-graders are generally 5 or 6 years old.

Many of the similarities and differences between children's and adults' behavior on websites are emphasized throughout this report. Designers should test website interaction with their target audience in order to fine-tune the design.

> 4. **Use standard interaction schemes**.
> Use well-known navigation and interaction methods that are common on other websites or are ubiquitous in the physical world.

Using standard interaction schemes has proved helpful in website designs for adults. Standard navigation minimizes the user's need to learn how to use the site. It also provides a familiar structure that allows users to feel comfortably at home even during their first visit. Using designs familiar to kids allows them to focus on the content of the interaction and not on how to navigate to it. This guideline relates to any type of environment with which kids are familiar — from standard Web navigation schemes to standard physical symbols.

One familiar interface was the *media player*. Users had no problem using any player that was similar to their physical media player — CD, cassette and video player. The play, pause, and rewind symbols were familiar even to the first graders. They had no difficulty relating these functions from the physical environment to the virtual one; therefore they needed no explanation or instruction for those interfaces.

Alfy and Sesame Street used standard icons,
minimizing users' learning curve.

An additional interface that appears to be standard and familiar to all users in our study is the *coloring book* interface. Because the majority of users had encountered digital coloring games in the past, even very young users found them attractive and pleasantly familiar. They immediately started clicking the colors in the palette and the areas they wanted to color in the painting. Any variations from their familiar environment, such as "reset colors" and "different picture," had to be learned. These unfamiliar interactions should be designed to be particularly easy to understand.

Sesame Street and Alfy used the standard "coloring-book" metaphor.

In contrast, some websites presented non-standard interfaces for their activities. Attempts to make cool new ways to navigate were a common theme. Kids didn't quite understand how to use these interfaces, and didn't understand why websites present these kinds of interfaces either.

On GameBrain.com, when users clicked on the games section, instead of the standard list of icons and / or text, the *game machine* appears. This machine is the navigational element of the games section and is the only way to reach these activities.

In order to choose a game, users must click the Back and Next buttons. This causes the desired game icon to appear in the middle of the scale, above the Play button, with its description below the button. On the left part of the machine there are various game categories, which change the whole scale of game icons available.

The game machine navigation caused confusion and dissatisfaction.

Users who got to the game page were a bit confused, but immediately thought they understood. They started clicking on the game icons that appeared at the top part of the scale (as they would do on a regular 'games' section). Nothing happened. After clicking around fruitlessly, some users just clicked "Play" and played whichever game was selected. Other more determined users got frustrated that they couldn't play the game of their choice. Only one pair of second graders[8] (2 out of 14 kids) figured the navigation machine out, and it took them quite some time, even using teamwork.

Users shouldn't have to invest time and energy in understanding how to use the website. They want to spend their time and energy interacting with the websites' content and activities, not puzzling out its navigation.

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[8] Second-grade students are usually 6 or 7 years old.

F o r m s   a n d   P a s s w o r d s

> 5. **Use standardized forms**.
>   Design form structure and widgets in the most simple and standard way. Most kids on the Internet today have an understanding of basic Web concepts, such as filling out forms and using passwords.

Forms on the Web have become a standard way for users to sign up for added benefits available on the website. Most adult users are accustomed to forms on websites asking for information such as a user name, password and mother's maiden name. We found that most kids were familiar with these types of entry pages also. They did not always complete the forms correctly, however, nor did they understand the significance of the information they were providing.

When designing forms, especially password log-in and registration forms for kids, designers must use recognizable and standard interaction components. Kids must be able to easily understand exactly what information is needed and why, along with the dangers of providing the information or not. (More on kids' safety on the Web on page 123).

Filling in text boxes presented some difficulties. The websites we tested had various types of forms. Most kids had no technical problems in filling out the forms; however, some mentioned that they did not have permission from their parents to complete them. Some younger users had problems completing the text boxes correctly and made spelling mistakes. The websites provided no feedback to help them assess whether or not they had completed the form correctly. Because users who are beginning readers are very sensitive to these issues, their confidence decreased and they wanted to leave the website.

> *"Designers should remember these sites are for kids, not adults, and not let us fill out forms…. We might make mistakes." – (Third-grade girl)*

One difficulty the kids in our study encountered was lack of standardization in the form fields. For example, on GameBrain's homepage, users had to fill in a user name and password to proceed to the site. The text inserted in the password box is centered — not aligned to the left as usual. Users struggled with this box when they started typing text and it began appearing in the center. They did not understand why it was not starting "from the beginning." Users tried various techniques to get the text "in the right place" including backspace, add spaces, erasing and typing again. They believed they were doing something wrong (second-grade boys).

*Lack of standardization caused problems at GameBrain, because the
password insertion box text was centered.*

Understanding Memberships

> 6. **Avoid members-only features.**
>   We found most kids aren't allowed to become members. Carefully
>   consider whether to offer memberships on your site at all. If you do
>   offer exclusive features, consider which information should be
>   accessible for members only, because most of your audience may
>   never see them.

As with form completion, some users were mislead by websites that presented both
a members' and a non-members' entrance. Most kids understood the concept of
membership — that is, what you need to do to become a member and the benefits
you may receive in return for signing up. They usually inferred this from their
experience with other types of offline memberships and clubs, such as magazines, TV
shows, and brands.

All of the kids we talked to were *not* current members at any website. They said that
their parents forbid it, because it costs money. When one of our users (a fourth-
grade girl) saw a password entry box on the screen, she immediately clicked the
Back button. She knew it was not the place for her.

When trying to build a user community through memberships, websites must clearly
explain upfront the costs and benefits of membership. If your membership is free,
emphasize that, in order to give users a chance to read about it before they
automatically turn away. Explaining why the website offers membership helps to
avoid parents' suspicions about conflicting interests.

> 7. **Don't ask kids for personal information that can endanger their privacy on the Web.**
> Encourage them to protect their personal information, for example: tell them to invent "screen names" instead of using their real names.

"I think sites shouldn't make you sign in and give your e-mail. Kids aren't supposed to do that" – (First-grade girl).

Both parents and kids are aware of privacy issues and dangers on the Web. This awareness does not always solve the problem of users providing personal information on websites, however. Often users assume a kids' website is acting responsibly, therefore they *do* provide personal information when asked for it.

Designers must pay careful attention to new laws regarding children's privacy on the Web (more on page 124). They must avoid creating situations in which personal information, such as real name, address, e-mail, and parents' names, are gathered. MaMaMedia.com offered a positive solution to this issue. MaMaMedia explained Web safety and prompted kids to invent their own "screen names" instead of providing their real name.

MaMaMedia's membership sign-up page
prompted users to invent a "screen name"
and linked to an explanation for every required item.

When Users Encounter Bad Web Experiences

"The Internet is a lot of times BORING because you can't find anything when you go on to it" – (First-grade boy)

Users' negative experiences with websites influence the way they address the Web as a whole. The first encounter with a website creates a *halo effect*[9] on the entire user experience. When users cannot complete the task they initiated, they can become so discouraged that they leave the site.

> 8. **Create immediate success.**
> Make it easy for kids to find what they want on their first attempt. The homepage and initial activities users encounter on a website should create immediate satisfaction.

""The problem with the Internet is that sometimes you try to look up stuff and end up getting something else." – (Second-grade boy)

"When I don't know what to do on a Web page, I just go look for something else." – (Fourth-grade boy)

Every page on a website contributes to the ongoing relationship between the user and the Internet. When users fail repeatedly and develop mistrust, they learn that the medium is not worth their time and effort. In order to stop this negative process, websites must create a positive learning effect by providing satisfying experiences.

> 9. **Make sure every feature is high quality and works well.**
> It is better to have fewer features that all work perfectly, rather than include some that are mediocre or difficult to understand. Negative experiences cause users to form a bad impression of the entire website.

Each time users are disappointed by a website, they lose trust that the site will deliver the experience promised. Negative experiences overshadow positive ones and minimize the likelihood that users will return to the website.

While navigating through Bonus.com, a user in our study tried to play two separate games and failed. In each case the game had no instructions and a confusing interface. He said:

"There is nothing I can play here! I really don't like this site!" – (First-grade boy)

Actually, Bonus offers many games that this user, like others his age, may have enjoyed and found satisfying. He did not stay long enough at the site to try them, however. A positive experience with the first games may well have motivated him to look for more interactive experiences. In this case, quality was much more important than quantity. It is better to provide users with higher quality games that they can easily find and use, even if that means offering less variety. A high-quality experience will encourage kids to return to the website.

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[9] Halo effect - The tendency to bias our perception of another person in the direction of one particular characteristic that we like or dislike (from Hilgard's Introduction to Psychology Glossary, 1999).

Concrete Thinking and the Need for Instructions

Using a virtual medium can be confusing for kids, especially younger ones. To make sense of the virtual world, children may rely on the physical attributes of the images they encounter. By comparing these images to things in the real world, users can infer their meaning, purpose, and use.

Problems occur when virtual attributes differ from the ones in the physical world. This incongruence causes confusion — the feeling that either things aren't working right or that you don't know how to do something. These feelings of unreliability and incompetence deteriorate the user experience and may result in users not returning to the website.

> 10. **Provide explicit directions**.
>   Tell the user exactly what to do, right on the screen.

Instructions for activities on many websites refer to the visual outcome of an activity rather than to how to interact with the interface. They describe the visible elements that users have to manipulate, but not how to use them. Instructions on websites for children usually do not explain the actual physical action, such as: click, drag, scroll, roll over, and so on.

This situation was demonstrated in an online version of the *connect the dots* game. When users were asked to connect the dots, they assumed the physical interaction online was similar to the offline version. No instructions were provided to indicate otherwise. They tried dragging one dot to the next as they would have drawn the line in a pencil and paper version of the game. In this online version of the game, however, users were supposed to click the dots in numerical order, not drag them. If this instruction had been provided, users could have focused on playing the game instead of on trying to understand how to play it.

*This virtual connect-the-dots game on Sesame Street
didn't work in the expected way.*

Another example of not transferring the instructions correctly from an offline to an online environment occurred in Playhouse's "Find Spot" game. In this activity, the user interacted with a book-like interface in which the animated character, Rolie Polie, asked for help in finding Spot the dog, by saying (in audio): "Have you seen Spot?"

The designer's goal was to prompt the user to click on the interface to look for Spot, to create a *living book*[10] type of interaction. When each circle in the book was clicked, a different sound and animation played. Spot's friends (who had not seen him either) appeared, along with clues to show where Spot had been. If users did not click on anything, nothing happened; but clicking was never mentioned in any instructions.

No cues were given for what users had to do to find Spot on Playhouse.

A first-grade girl who encountered Playhouse's "Find Spot" game was excited to see the character, who she recognized from other places such as TV. When the character asked her, "Have you seen Spot?" she answered "no" aloud. Then she waited for him to speak again, unsure what to do next. She clicked "next" to go to the next page, but the interaction there was the same: "Have you seen Spot?" The user looked at the test facilitator for advice. According to standard user testing methodology, the facilitator was not allowed to help, so the user simply clicked "next" again, till she reached the end of the book.

This user never got to the living-books activities, and when she finished the entire book, she still did not understand where Spot was. She felt discouraged, and did not want to try another game. Had the character explained what the user physically had to do, or if the interaction required had been apparent without instruction, this user would have been much more likely to understand the interaction and enjoy it.

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[10] The interactive 'Living Books' series introduced by Broderbund was one of the first attempts at designing interactive CD-ROMs for kids. Kids could click on various items in a picture and receive entertaining animated feedback. This kind of interaction became very popular in many CD-ROMs for children.

Images and Meaning

> 11. **Use icons and symbols in familiar ways**.
> Match icons' design to their meaning in the physical world.

Users interpret icons and images they see on websites, which sets their expectations for content represented by these symbols. For example, when they saw a book icon, they inferred it represented a learning activity; when they saw a pencil image, they assumed it symbolized a school-related activity. Many symbols are familiar from other media, such as TV, books, movies, and video games. When familiar images were used on the Web to imply a different meaning than the one users already know, users got confused and interacted with the website differently than the designers intended.

We asked a pair of third-grade[11] girls to find information on the sport they said was their favorite — soccer. On the Sports Illustrated for Kids homepage, they saw a picture of someone playing soccer and immediately clicked it, which did not bring them information about soccer. Instead, this icon led to the games section. This icon had a small picture of someone *playing* soccer, perhaps to imply that users could also play in this section, which included various interactive games. These disappointed users found no information on soccer in this section and felt discouraged about the website.

Images using a content-specific metaphor
created errors and dissatisfaction on Sports Illustrated for Kids.

Another example of literal thinking occurred when a first-grade boy was browsing Galim's website. He clicked on the life-preserver icon on the homepage.

"This is cool — I'll pick this because I love the sea!"

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[11] Third-graders are generally 7 or 8 years old.

When he clicked the life preserver icon, he expected to find marine-related content and activities. The life preserver icon was actually the Help icon, however, symbolizing a life preserver on the Web, rather than something to do with the ocean. The designers thought the nautical metaphor was applicable because "galim" in Hebrew means "waves," but the user did not understand that abstract context. He was confused when he was shown the help page rather than the marine-related content he expected.

Like the misleading life-preserver Help icon,
Galim's submarine icon that links to the guided tour feature
might confuse users as well.

In a different situation, some of the users in our study did not click on the icon for audio instructions at Alfy, even though they were looking for instructions. The icon — an ear — did not represent narration to them. Rather, it appeared to them that the website was hearing something. On other pages, Alfy presented an alternative icon — Alfy speaking into a microphone — for audio instructions. Users understood this icon to mean audio was available, relating their physical-world experience to the Web. They understood this icon to mean Alfy would be talking to them.
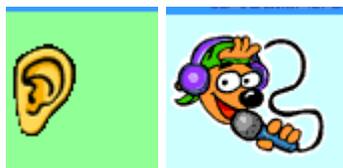
Two different symbols for narration on Alfy.
The one that looked more like talking worked better.

Keeping the icons consistent also would have helped Alfy's users. Once they learned what this icon meant, they could immediately have understood their options each time it appeared. From other studies, we know that varying designs and inconsistent presentation can cause users to feel confused and to use a feature less often.

When choosing a symbol to represent interactive features, align the symbol's meaning with the representations and the context of those features in other media and the real world. Test icons to be sure that users immediately understand the symbol's meaning, rather than having to cope with different meanings of the same symbol in different contexts.

TEXT

Legibility and Text Design for Beginning Readers

> 12. **Use simple, relatively large fonts**.
>   Text fonts on screen should be comparable in size to at least 12-point print type (when viewed on the target audience's most common screen resolution). Provide good contrast between the text and the background. Contrast is especially important for beginning readers and those who are reading a second language.

We observed children having difficulty reading text that was not presented in a simple, legible font. Users struggled to read each word separately, trying to create a meaningful sentence. They put their fingers on the screen in an effort to comprehend and identify each letter aloud. Some were visibly frustrated, because they were confident that they *knew* how to read, but the website's fonts undermined their new skills.

This phenomenon was intensified with first graders and international users, who were not as experienced or fluent in reading English. When fonts were unsuitable for them, they had to make a greater effort to read titles, navigation elements, content paragraphs and instructions. The fonts on the websites we studied varied in size, type, color, and background — all of which affected their legibility.

Font size — First graders had difficulty reading small fonts. The font size that was hard to read varied in our sessions depending on the website, and on factors such as the text's style, user's monitor size, and screen resolution. Fonts designed to appear at least 12 points on screen were not perceived as too small, however.

Similar findings have been reported with kids in grades 4–6 (children aged 8–11). A study presented at the 2001 Usability Professionals Association (UPA) conference by researchers at Software Usability Research Laboratory at Wichita State University (SURL) demonstrated that 14-point font size is considered easier and quicker to read, as well as being attractive[12].

Typeface — Many websites try to make their titles — and sometimes all of their text — look unique by using irregular and fancy typefaces. Some of our first-grade users struggled with these and spent extra time and effort trying to figure out the letters.

Font Color — Text designs without significant contrast between the letters and their background were harder to read.

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[12] Michael Bernard, Melissa Mills, Talissa Frank, & Jan McKown, "Which Fonts Do Children Prefer to Read Online?," SURL, 2001.

Low contrast created hard-to-read titles and links at Kids.com.

These typography principles are well known in the design world, and they also apply to text design for adults. Following good type guidelines is even more crucial when users are beginning readers of the language — whether they are very young or the website's language is not their native tongue. For these users, the language struggle is conscious and frustrating, and the additional work to decode unsuitable fonts may cause users to abandon the website.

Low contrast and using pictures of text can create serious problems for users with visual impairments as well, making their web experience even more complex than it already is[13].

> 13. **Place text on solid backgrounds**.
> Avoid putting text on background images, especially if they are dynamic.

Children's websites often use background images to make pages appear more exciting. These images make reading text more difficult, especially for younger readers in the first and second grades. Users' reading slowed down substantially when images were overlaid with text, whether tiled or one-picture backgrounds were used.

AlthoughKids.com had a strong contrast between the font color and the background color, the background images made reading more difficult.

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[13] "Beyond ALT text," Kara Pernice Coyne & Jakob Nielsen, 2001. www.nngroup.com/reports/accessibility

> 14. **Do not use animated text**.
>   Using animation or other special effects on text causes problems when it is too slow or too fast, or when objects and text are superimposed. If you must animate text, let users control the pace.

A problem with animated text occurred in our study on Kids.co.il. In the Flash introduction (intro) movie, text moved from the left part of the screen to the center, while a number of images moved in front of and behind it. One user had difficulty reading the moving title, and when it was overlaid with one of the characters on the screen, he gave up. Our frustrated user said to the character on the screen:

"How do you want us to read the text if it's behind you?!" – (First grade boy)

A moving title that was hidden by the left character
made text hard to read on kids.co.il.

Another problem occurred on this page because of swiftness of the text movement. In this Flash intro, the text moves to its place on the screen. Once the intro is over, the text disappears and the homepage appears instead. One user did not finish reading the text before it disappeared, however, and became frustrated with the experience.

Users' dissatisfaction occurred when text animation was too slow, as well. Our users viewed the "Tourist in space" article on ABC4Kids. Here too, the text is animated, and it glides into the frame from left to right. Our users (second-grade boys) were restless — they wanted to get to the content. They did not want to wait for the title to scroll in slowly. They tried clicking the moving title in order to continue, and when that did not work, they clicked something else on the screen that took them to a different section of the site. In this case the moving title caused the users to abandon the article.

What does that say? Users didn't want to wait to find out.
In the international space station article, the title was animated and
rotated, which made it hard to read.

When adding special effects for typography, designers must consider the user's goal in reading the website's text. Even if only a title is presented, users want reading to be effortless. Ease of reading does not imply that the text should be unattractive, but its design should not compromise the user's enjoyment. Otherwise the users will not read it at all.

Readability and Suitability to the Medium

> 15. **Use easily understandable and succinct text only**. Minimize the amount of text on screens.

We know from adult user studies that reading long pieces of text on a screen is a difficult task. Reading from computer screens is tiring for the eyes and about 25% slower than reading from paper[14].

This difficulty occurs with kids also. Users had difficulty reading text that was not written and designed for the Internet. Often, kids interpreted a full page of reading as hard work. When they encountered long text passages, they immediately wanted to do something else. Sometimes our users started reading the text, but gave up when they discovered the effort it required. They said:

"This page is hard. It has a lot of words." (Yahooligans!)

"I don't read the titles — I just click on the cool icons." – (Zeeks' games)

"This is boring! There are a lot of words here!"

---

[14] Jakob Nielsen, "Alertbox: Why web users scan instead of read," 1997.
www.useit.com/alertbox/whyscanning.html

On Zeeks, users didn't read the titles, and on Yahooligans! they were disappointed that there were only words.

More boys than girls complained about too much text on the page (40% of the boys in our study complained, compared to 8% of the girls).

When designing for beginning readers or international users, add meaningful images that allow users to understand the content and navigation without having to read the text. One partial solution for instructions is to use audio. (See page 57.)

Writing for the Web should focus on both content design and layout:

- **Content:** Sentences should be straightforward and concise.

- **Layout:** The content's structure should be communicated clearly and allow users to scan the page and find the chunks of information they are interested in.[15]

Browsing through kids.co.il, one user tried to find information about sports. He clicked the sports icon, which brought him to the sports page. To his surprise (and disappointment), the page was full of text. It had a detailed review of the latest soccer game. Our user clicked the Back button and said:

> *"There was a lot of writing here, I expected more sports stuff." – (First grade boy)*

Long pages of text frightened users away, even if they were interested in the content.

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[15] For more information about how people read on the Internet see *Designing Web Usability* by Jakob Nielsen p. 100.

The content heading on kids.co.il interested this user. He was there to learn more about his favorite sport — soccer. The presentation of the information overwhelmed the first grader, however, and caused him to give up on this category. If designers had presented the content in small chunks of information, with titles for each paragraph, the user could have scanned the article and read any topics that interested him.

An additional issue that made the text in this example harder to read was the alignment of the text. It is always easier to read paragraphs that are aligned from left to right in English, or in this case — right to left in Hebrew. In this example, the whole article text was centered. Centering text may work for titles but makes reading harder when the text is longer.

A good way to maintain appropriate readability for the Web is to have a professional Web editor on the design team. The editor can revise content for the Internet and guide the designers on layout in terms of readability.

> 16. **Maintain a consistent readability level**.
> Make sure that text on all pages and activities consistently reflects users' expectations and reading capabilities.

The reading level of the content on some of the websites that we tested varied significantly among its sections. A few pages had some text at our users' reading level and some pages of text at a much higher reading level. This inconsistency confused users who were expecting text to be the same level of readability from page to page, when they encountered difficult text. Sometimes users tried to read the more-complex text, and other times they gave up at first sight. Often this unpleasant surprise upset users and made them want to leave the page or even the website.

An example of inconsistent reading levels in one site was found on Sesame Street. A very minimal amount of text appeared on most of the pages. The text inside the icons was big, easy to read, and age-appropriate for its users (preschool through second grade). This design made reading through the pages and games easy for users.

This screen capture shows the typical reading level at Sesame Street.

Some of our users clicked the "coloring pages" section, however, and were overwhelmed when a six-screen page full of text appeared. This page included links to all the coloring pages available for download from the website. There were 19 categories with at least 10 links each, all on the same page. Users were unsure what to do and tried clicking around. All of them left the site dissatisfied.

A Six-screen page full of text surprised users
on Sesame Street's coloring pages.
→

Belmont Bank's Kid section also had text with inconsistent reading levels. The first page seemed friendly in terms of the amount and reading level of the text, but one level deeper users saw a page with three screens full of small text with no images.

On Belmont National Bank's Kids Corner homepage,
users were curious about what they'd find.

Users were happy to explore this website when they saw the homepage, but became surprised and discouraged from going further when they encountered the second page.
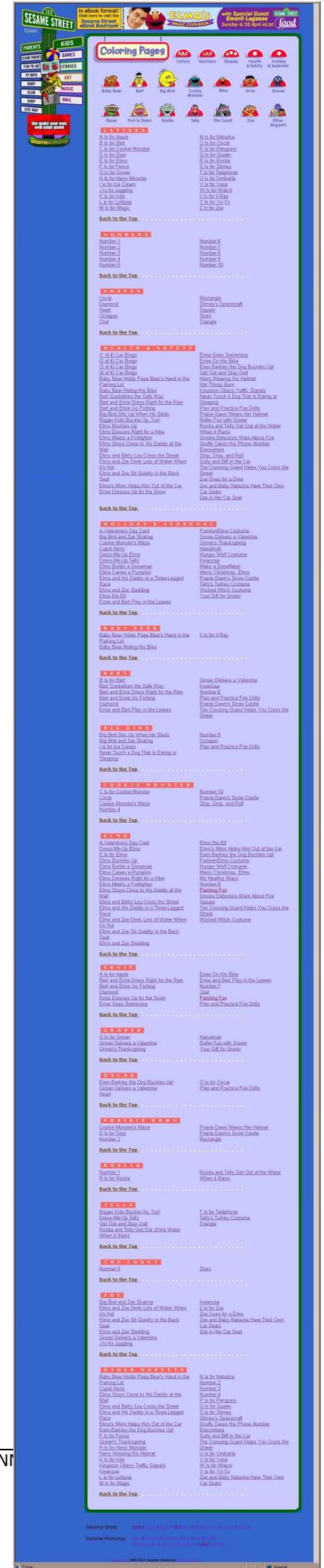
All about Personal Checking

*Belmont National Bank's second-level Kids' page
had an inconsistent and inappropriate
level of language and layout.*
←

When designing text for a specific age group, the reading level and its consistency on the website can be crucial to the users' comfort. Users sense the reading level and accordingly assume that the website is designed for them, or not.

One way to estimate the readability level of your text automatically is to use the "show readability statistics" feature in Microsoft Word. It is located with the spelling and grammar tools.

At the end of your spell check, this feature will show you the level of readability of the text in your document, as defined by US standards. Most methods to estimate reading level rely on analyzing word and sentence length, so using shorter, less complex sentences increases readability, particularly for inexperienced and marginal readers.

Readability Statistics	
Counts	
Words	2185
Characters	10704
Paragraphs	73
Sentences	128
Averages	
Sentences per Paragraph	2.7
Words per Sentence	16.2
Characters per Word	4.7
Readability	
Passive Sentences	8%
Flesch Reading Ease	61.8
Flesch-Kincaid Grade Level	8.6

*The readability statistics box in Microsoft Word.
The last element — Flesch-Kincaid Grade Level —
shows the readability level of your text,
in school grade levels.
In this example, the readability is proper
for eighth graders (12–13 years old).*

Many websites have a *grown-up* section, which explains to adults the site's value and the organization responsible for it. Because this content is aimed at users of varying ages, it should be appropriately written and designed for adults. This category's location should be carefully considered, however, because children might stumble onto this section and not know where they are, or what to do.

Confusion occurred when some of our users stumbled onto one of the "parent pages" on Sesame Street. Finding themselves in an environment totally different from the one they were accustomed to, they did not know how to go back and just continued clicking on links. This clicking brought them deeper into the adult section. In the end, most of our users asked for help from the facilitator or just said they wanted out.

When designing a grown-up section, use a prominent title informing users that this section is for adults, and present an easily noticed way to go back to the kids' section should children wander in. Place the grown-up section in a separate area from the kids' content, so children won't be tempted to click it in search for more content and activities.

Sesame Street's navigation placed the parents' sections right next to the kids' section, with no visual discrimination. Kids who don't read each title thoroughly might end up in the wrong place.

MaMaMedia's homepage distinguished very clearly between the activities for kids (big 3-D icons) and the grown-up section (textual link at the bottom of the page).

Explicit Directions and Instructions

> 19. **Add short and unambiguous textual instructions and directions**. About half of your users depend on text to explain the website's activities.

We discovered that unlike adults, many kids read all of the instructional text that appeared on Web pages. In fact, some read this text several times out loud prior to playing a game. Many kids read all the text on the homepage as well, including a linear review of all of the categories. Once they were introduced to a new website, they went word by word and read all the text available on the page, verbally mapping their possibilities. This behavior is in stark contrast to adult users, who typically skim text online.

This observation occurred on various websites and seemed to be based more on individual differences of the children using them, rather than on design differences in the sites we tested.

*These websites included textual menus of categories and activities
available for users. Many kids read all the text on a screen
before going deeper into the content.*

In websites where reading text is the main activity, our users (second graders — both boys and girls) read *all* the text of an interactive article. Although this entailed page after page of reading, they continued until the end of the story. We saw this behavior on ABC4Kids, where users read an entire article about the new "Space Tourist."

Users read all the text on each one of the number of pages
in this interactive article on ABC4Kids.
Each article included 5–7 pages like this one.

The websites we examined varied greatly as to the extent of textual directions, instructions and explanations they provided. Examples ranged from a full page of text to none at all and from instructions appearing only at the beginning to those made constantly available.

Children in our study read instructions. They preferred straightforward and concise directions, with the option to read them whenever they felt they needed them. Unlike adult users, many kids wanted to read directions and text on websites. In fact, they looked for them. Many kids in our study read the instructions aloud, and only then began to play the game. This behavior is understandable, considering that reading is a major theme in kids' lives, and they likely expect text to explain things about their environment.

Too Much Text

Including textual explanations and instructions was helpful. Users were discouraged when the explanations were too long, however. One paragraph of text was usually just the right length, as long as the explanatory text was understandable and practical.

A proper degree of explanation on Funbrain's Math Baseball (top image)
and an excessive explanation on Bonus's Lemonade Stand (bottom image).

Too Little Text

> 20. **Provide instructions that are always accessible**.
>   Place easy-to-find links to brief text explanations wherever the user
>   might need or want instructions.

When users encountered activities that lacked instructions, many complained. Some
of their responses were:

"I didn't like that the directions to the game weren't clear enough. I didn't know where to click."

"I didn't understand the game 'cause there were no instructions."

In our study, more girls than boys read instructions and complained when they weren't any (76% of the girls compared to 33% of the boys). One way to address this issue is to always provide a link to textual instructions.

Adding a prominent link to instructions allows users to read them first if they wish and does not force those who do not to waste their time. A good example of this strategy was found at Squigly's Playhouse. A user could choose the game or activity, which immediately loaded; however, users also had access to instructions. If users started playing the game without reading the instructions, they had the option to go back to them at any time during the game.

Squigly's Instructions link was always available.

Providing instructions is essential, but so is striking the right balance between information and user needs. Chunking information and using bold text and headings to set off important phrases can help readability a great deal. So can editing your text for simplicity and directness.

This curve presents the usability of text: neither too much nor too little text was satisfying, and most users were pleased to have a short useful explanation.
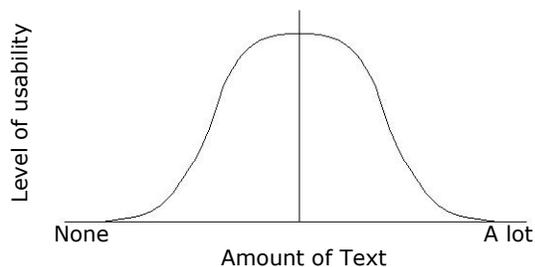
When Text is Not Enough

> 21. **Help inexperienced readers by supplementing text with other kinds of explanation**.
> Don't rely solely on text when designing instructions for beginning readers and international users. You may provide directions using other media, such as diagrams, animation, and sound.

One group in our study had difficulty with the text on websites or disregarded it completely. Some had trouble with reading in general, especially younger kids and international users. Sometimes they tried to read, but quickly give up. They either clicked another link or just left the page. Often they didn't even attempt to read the text.

This behavior occurred more on pages full of text, rather than pages with titles or short paragraphs. When users saw a vast amount of text, they seemed discouraged to even begin. (More on problems with text on the Web is on page 37.)

MULTIMEDIA

Animation Uses

Designers have been using animation on children's websites for as long as animation on the Web has been possible. In fact, the general design principle seems to be that more is better, and many designers of children's sites added animation wherever possible. In our study we looked at the effects of multimedia in general, and animation specifically, and tried to assess whether more animation on websites is really better. It turns out that is not always the case.

The websites we used in our study contained various kinds of animation elements, such as animated GIFs, dynamic HTML, Flash, and Java. The animations' performance and quality varied greatly. We studied animation's effect on children's interaction. We focused on three different uses of animation:

- Minimal animated GIFs — either stand-alone images or those used as rollovers.

- Animated openings (splash screens) and/or standalone games/activities — embedded in the HTML.

- Flash-based interfaces — such as those on Wonka, Alfy, and Sesame Street.

Bandwidth and Animation Usability

> 22. **Design multimedia for your audience's connection speed**.
> Research your potential users' technical environment. Use animation in your design ONLY for users who have a high-speed Internet connection. Flash movies over a modem or similar connection caused frustration that usually resulted in users skipping the animation or clicking the Back button.

We studied users with a variety of hardware and connection speeds, ranging from new personal computers with high-speed connections (DSL) to older computers with modem connections (56k). Connection speed and computer performance directly

impacted the users' enjoyment and ability to interact with and perform tasks on animated websites.

Users with slow connections generally had completely different experiences than those with fast connections, when using the same websites. These differences were magnified on sites that use multimedia with large file sizes. Most of the users who had fast Internet connections were intrigued by animation and tried to interact with it, extending their stay at the site. All users who had a mismatch between their Internet connection speed and the bandwidth needs of a site's multimedia elements were at some point frustrated, and even angry, at the website's poor performance. They usually wanted to leave the site and not return.

Designers do not always know enough about their users' technical environments. When designing multimedia-rich websites for kids, knowing your users is crucial, however. As we show in our further examples, appropriate streaming-media planning can be the make-or-break factor for the whole Web experience; therefore, companies must research their potential users' technological capabilities and plan accordingly.

> *"It takes so long to get some things… it says it's loading, and then it takes too long." – (Fourth-grade boy)*

> *"Make it go faster! Maybe if I click it, it will go faster…." – (First-grade girl)*

We saw several kinds of reactions while users were waiting for Flash files to download, but they all showed their dissatisfaction with the website when they had to wait. The longer the users had to wait, the worse their reactions got. Many just clicked the Back button. As one of our users said:

> *"When I don't know what to do, I go look for something else." – (Fourth-grade boy)*

Children are more likely to use low-end technology than other computer users. Many schools receive donated computers and often have only a phone line for connecting. At home too, kids often 'inherit' older computers from their parents or older siblings. For these low-speed users, animation in general — and large Flash files specifically — made the user experience poorer, frustrating users, who wanted to leave the site before even reading its content.

Waiting and Distraction

On the Sesame Street website, a first-grade boy waited for a Flash animation to download. While he waited, he skimmed the front page and found an interesting icon on the bottom — a character he recognized from somewhere else. He clicked on that icon, and without being aware of it, he left the Sesame Street website before he even got to the homepage.

The designers lost that user due to a combination of negative factors: a long download and distracting visual content. Not only was the user bored waiting for the Flash intro so he could get into the website, but a tempting banner also distracted him from his initial goal. (For more information on banners and their effects, see page 84.)

Had the designers eliminated the long wait, the user would not likely have wandered to look at various banners and would have continued directly to his initial interest —

the Sesame Street homepage. That's exactly what happened with our users on high-speed connections, who experienced almost no waiting time for the Flash animation to download.

While waiting for the Flash to download on the Sesame Street staging page,
users' attention wandered to the icons at the bottom.
Most of the icons led to different sites.

Positive Encounters with Flash

> 23. **Use motion and sound to attract kids' attention and engage them**.
> Kids find animation and sound extremely engaging. Use animation as a way to focus users' attention on important elements on the screen. Make sure that the animation does not interfere with the element's functionality.

Flash movies transferred over high-speed connections can provide a positive experience by creating a rich environment that incorporates all the multimedia elements previously seen only on CD–ROMs. Our users were highly engaged and drawn to characters interacting with each other online. Users enjoyed listening to music and taking part in the action. On websites that incorporated multimedia appropriately for the technological compatibilities of the users, all of our users were motivated to go on to explore the website.

The main benefit of using Flash on children's websites was that it sparked children's enthusiasm and interest in exploring the website. This effect was especially evident with users' first impressions of websites. Sites that presented users with interesting, fun-looking items when they entered the site drew great curiosity and immediate clicks.

Alfy, for example, presented Flash in a way that made a positive first impression. On the staging page and the homepage, users saw a variety of familiar objects that signified activities and content. Some items were animated automatically, while others were triggered by cursor rollovers so the effect was not too overwhelming.

"This website looks cool! It looks like it has a lot of fun things to do!" – (First-grade boy)

Flash used well at Alfy conveyed the many fun things to do there.

In other cases, users responded strongly to introductory animations that drew them into an activity. On GameGoo.com, kids who chose to play "Squanky the Tooth Taker" received a short animated introduction prior to the game instructions. This 10-second introduction shows a child dreaming about the tooth fairy, who is suddenly zapped and turned into weird Squanky. Our users laughed at this funny and bizarre clip, then paid close attention to the following 25-second instruction clip. The activity's instruction clip was also humorous, when Squanky explained what he does to the users and showed them an example of how to play the game.

As with TV cartoons, children reacted positively to and were especially engaged by high-quality animation and activities that incorporated a storyline with a minimal plot and characters — such as "Squanky the Tooth Taker" on GameGoo's site. The second graders who selected this learning activity were fascinated by the movie and excited to play and learn.

(Left to right) Squanky zaps the tooth fairy to the kids' surprise.
Squanky introduces himself and explains the game.
A demonstration of the game's interaction.

> 24. **Show users the status of multimedia downloads and playtimes**.
>   Present progress to completion, how much time or file size remains for
>   downloads, and how long it takes to play the actual multimedia clip.
>   Tell the user about stalls or interruptions so they can make an
>   informed decision about the rest of their session.

Unlike the Sesame Street staging page example that distracted users from entering
their site with too much visual information and waiting time, other websites chose
the exact opposite approach. Kids.co.il eliminated all screen elements (including the
browser's navigation bar) while the Flash intro was loading.

Users were annoyed because they could not control the browser environment as they
usually did. One fourth grader noticed that there was no change on the screen during
kids.co.il's Flash intro, and did not know where to click. This problem occurred due to
a network problem; however the user didn't understand if the intro was over or not,
and if he should wait or continue. He turned to us and said: "I think it's done. What
do I do?"

This design had too little information and insufficient visual cues about the status of
the Flash movie. Users wanted to feel in control — to be allowed to judge the
download time and decide if they wanted to skip it. When left with limited choices,
many went back to the site staging page window and used the Back button to escape
or stated that they wanted out.

Adding a visual progress bar for multimedia downloads allows users to oversee the
whole process. They can tell where they are in the process, how long it will take, and
if the download is not working.

> 25. **Allow the user to control the multimedia clip**.
>   Provide an explicit skip feature (such as a "skip" button) for all Flash
>   movies. Use familiar keyboard controls (such as ESC) to allow the user
>   to pause, skip and play the movie.

Users looked for the option to skip Flash intros. Some kids were impatient and
wanted out, when the Flash intro took more then a few seconds. More-experienced
Web users were especially impatient. They had come across downloads and
animation clips before and knew that it might take a long time before they would get
the content they wanted.

Users in these cases tried to find ways to bypass the Flash intro. Many tried clicking
the center of the screen, hitting the Esc key or space bar, or clicking any visible
"skip" icon. On websites that lacked these escape features, the users' actions would
only slow the process even more, making them wait longer for the actual content.
Users never tried the mouse-driven contextual menus provided with Flash.

A replay option, especially for younger users, may be useful and engaging. A replay
button would allow kids to watch a Flash animation repeatedly and at any time they
wish, and those who didn't want to watch the animation repeat wouldn't have to.

> 26. **Make intro animations short and interesting**.
> Animations that are short (10 – 20 seconds) and meaningful (funny, surprising, intriguing, and so forth) work best. Boring intros or long waiting times can cost you your audience.

Download time was the most common reason users wanted to skip a Flash intro, but there were other reasons as well. Ironically, both boredom and excitement motivated users to back out of the Flash intros.

Boredom occurred, for example, because an animation was slow, long, and without any true development. An example of this occurred on Kids.co.il. The 40-second intro clip showed two animated characters waving at each other in an animated loop. Meanwhile, behind them, the website logo was constructed, and when it is complete the clip ended. Our users waited for something to happen, and when they realized this was just an animated loop, they wanted to skip it and find out what the website *really* had to offer. Apparently the type forming a title in the background was not interesting enough to them.

When no real content is exhibited, it is better to design a very brief, catchy clip that gets the users' attention and lets them move on.
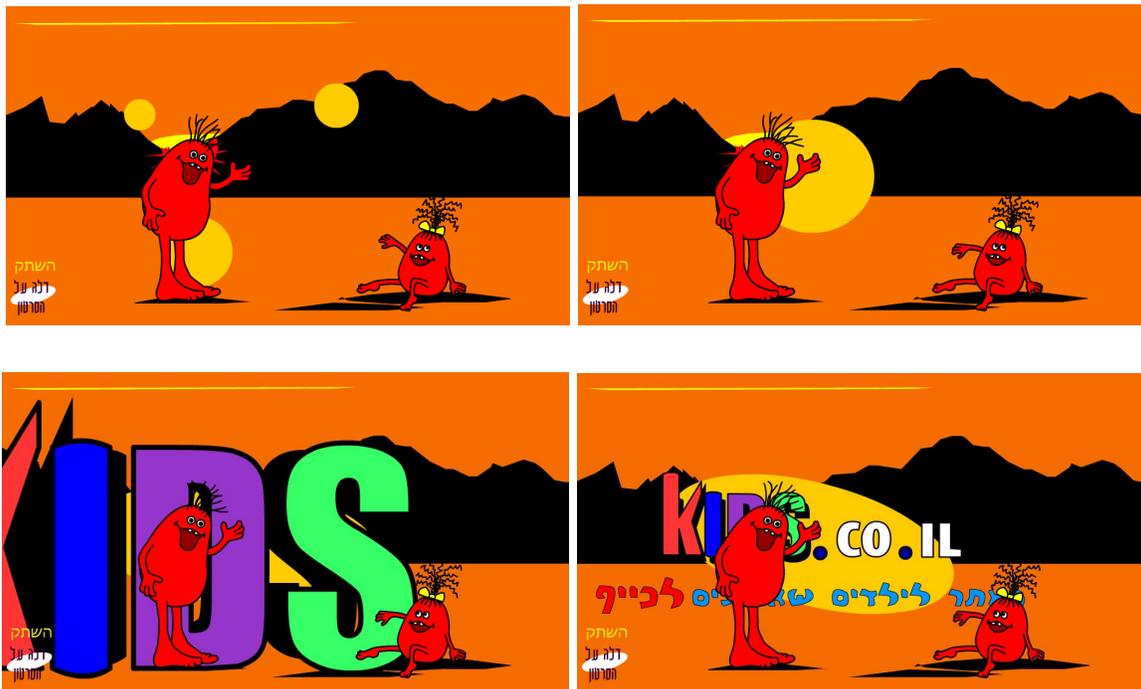
Screenshots taken approximately every 10 seconds from the kids.co.il
Flash intro, where nothing happened.
The characters were in the same loop during the whole 40 seconds
while the logo formed in the background.

Kids also wanted to back out of a Flash intro when they were so enthusiastic to get to the actual activity they lacked the patience to wait for the animation. Users wanted to click through the intro and get directly to the game. For example, on GameGoo, kids got really excited when they discovered the site featured a skateboarding game and wanted to play it immediately. Although the Flash intro — in which Fearless Frieda the skater introduced herself — only lasted 13 seconds, they

were so keyed up about the skating game that they wanted to start it right away, and not waste time on the intro.

> *"Do you wanna skip the intro and go straight to play?" – (Third-grade boys)*

It's good news when users are highly motivated to get to the content; however over-eagerness may cause users to skip over important information. At GameGoo, the game instructions clip followed the intro clip, and the eager kids did not listen to the instructions and then had problems playing the game. Make animations short and meaningful so users' won't think of it as a waste of time or ignore the important information it conveys.

Interim Games

27. **Use passive animation while downloading large game files**.
    Add simple, fun animations to hold users' attention while loading large files. Using interim interactive games for this purpose is not recommended. If you do use games, provide effective feedback to signal download completion.

Some websites have incorporated an interesting solution to solve the long download time problem. They offer lightweight games that load before the main game downloads. Users can play these games while waiting for the Flash movie to load. For example, on KidsKorner, the user clicked on a game called "The Penguin Plunge," but received a trivia game instead while the full game downloaded.

The substituted game confused some of our users, because this was not the game they expected to appear after they clicked the game icon. By the time they figured it out, the trivia game disappeared and the chosen game began.

> *"What is going on here? Where did the game go?"*
> *"This is the REAL game I think" – (Third-grade boys)*

After choosing the Penguin Plunge, users got an interim game screen while the game was downloading.

Other users started playing GameBrain's interim game and became so engaged that they never noticed when the download ended for the original game they chose and that a blinking "Play Now" icon had been activated. Because they didn't notice this signal, they would not have reached the real game without help.

If you do choose to use an interim game as a download distraction, make sure that when the original download is complete, the feedback appears within the interim game's area and not beside it. Showing download feedback where the user's attention is focused improves the odds that users will notice it and switch to the real game.

Users played an interim game at GameBrain during the download of the game they chose. This feedback didn't get their attention.

In a different game on the same website, GameBrain offered a better solution than an interim game for download waiting time. After clicking an activity category, users had to wait for a Flash interface to download. GameBrain's designers created a short and simple animated image to catch users' attention while they are waiting. This comparatively simple loop-animation of a worm hitting itself on the head with a hammer was a huge success with our users. They laughed while the Flash downloaded.

This simple, funny animated worm captured the attention of waiting users.

In order to keep users engaged but not distract them from the main activity or chosen task, designers must find the middle ground. One way to accomplish this is to use minimal but fun animations to hold the users' interest while loading large files.

It may be best to avoid engaging the user in a complex interaction or game as a download distraction, because they might not want to leave that activity, or they may feel disappointed when the main activity begins. If this happens during your user testing, consider promoting the engaging interim activity to a main activity. In general the use of games to distract the user may backfire, if users are too engaged by them or if they become disappointed and give up on the site before the main content appears.

Flash Replays

28. **Avoid automatic Flash replays**.
    Avoid both re-downloading and re-running Flash movies that users have already seen or skipped (such as homepage interfaces or intro clips).

29. **Provide non-multimedia content alternatives**.
    Provide both a Flash and non-Flash entrance to the website or web page.

All users were extremely annoyed when they had to wait for the same Flash download for a second or third time, no matter how fast their connection speed was. Repeat downloads occurred when a user clicked the Back button to return to a page with Flash elements, when they refreshed Flash-based pages they had already seen, or when they went to a new section that used the same Flash interface they'd already downloaded for previous pages.

Users' common reaction was to try to stop the additional download, either by clicking Stop on the browser button bar or by clicking the Back button. They did not want to spend their time waiting for a Flash interface they had already seen.

Users became impatient on Sesame Street because every new page demanded a new Flash download — and thus additional waiting. Each time they clicked to get to a new page or to go back to the homepage, a download animation that looked like the Count from the TV show appeared to count down the numbers. Many users tried to click Back to escape from that screen — which triggered another download. Most of the first graders responded with frustration to this drill.
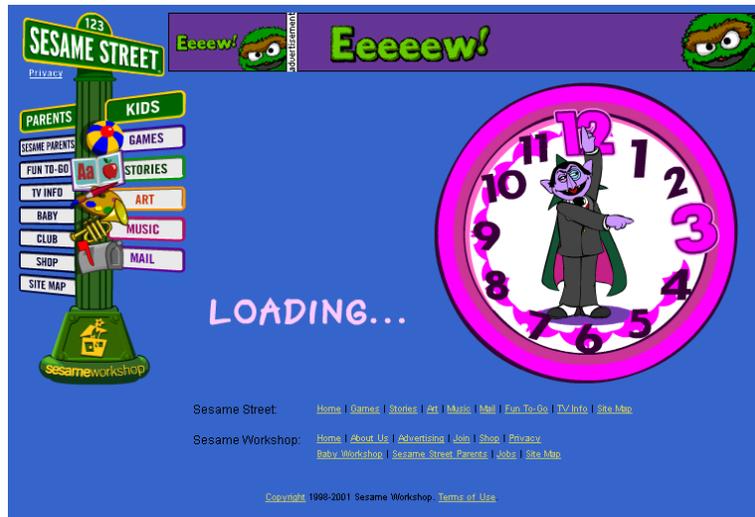
Users were frustrated with Sesame Street because every page required a Flash download, even the ones they'd already seen.

The same problem occurred on Wonka. The first time users encountered the Flash on the homepage they were engaged and excited. It showed an animated Willie Wonka machine being built and each part of it coming to life gradually, which disclosed the various site features. When users returned to the homepage to find a new activity, however, they became impatient because the whole Flash interface downloaded again. They tried to skip the intro, but didn't succeed in doing that either. (Wonka has a skip-intro feature, but it is designed in a way that users never found it or clicked on it. (Read more about designing clickable text on page 75.) The standard skip conventions from CD-ROM application and games, such as clicking the ESC or space keys, did not work when users tried them.

When users clicked "Home" on Wonka, they went to this page that had a Flash animated interface. Each time they had to wait for the Flash file to download again and play completely.

A design that kept the Flash movies and interfaces brief would have helped ease our users' impatience. Over a slow Internet connection, however, even if the movie is brief, it could be quite annoying to download over and over. A better solution to this problem would be to make sure the system detects whether the user has viewed (or skipped) the animation already. Interfaces could be reloaded quickly from the browser cache, Flash movie re-runs could be skipped automatically, or the content could be re-presented in a static page. In each situation we saw, giving the users the option of a non-Flash page would have helped.

Audio as Background Music

In most cases, children's reactions to audio on websites were similar to their reactions to animation. As an enhancement to the user experience, audio was generally welcomed enthusiastically, unless it slowed the interaction and worsened the user experience. Audio provided an additional dimension to the Web experience, which proved powerful with kids. (Some examples of audio and children's concrete thinking can be found on pages 30 and 100.)

> 30. **Use background music for ambience but give control to the users**.
> Consider using background music when designing for kids, but give them an easy way to control volume or to stop the music at any time. Kids enjoy cheerful background music — but want the option to turn it off at any point.

Children hear music all around them (via TV, radio, CDs, tapes, video games, and movies) and find audio output from websites natural. The majority of our users enjoyed music on websites. Users' experience of audio (like their experience of animation) was influenced by both the design of the music (quality and quantity), and by the technology (time to download).

A positive user experience with background music was based on:

- **Unobtrusiveness** — consistent, but not invasive, background music.

- **High fidelity** — pleasant tunes with reasonable audio quality.

- **Speed** — only a few seconds of waiting for file downloads.

Websites that balanced these elements were successful in enhancing their users' experience. Websites that either overdid or underdid these factors received various responses from users, varying from indifference (when there was no stimulation) to annoyance (when the download time was too long).

Websites such as MaMaMedia got positive initial responses from users. An automated midi file played cheerful tunes in a loop on the homepage. Users smiled, their eyes lit up and they looked happy when the music started playing. At some point, however, a few users wanted to stop the music. They had no immediate way to do this and expressed dissatisfaction.

> 31. **Do not disrupt users with sudden loud sounds or music.**
> Abrupt changes in the users' environment can be jarring. Turn up sound gradually and allow immediate user control of mute and volume.

For some users, the automatic background music was startling and unexpected. In some cases users' speakers were not set at an appropriate volume. Users wanted to

lower the volume of the audio (third-grade boy) or mute the sounds completely (first-grade girl). Audio should start low and increase volume gradually, and the interface should allow the users to control the volume immediately (both high/low and mute).

> 32. **Make the audio visible**.
> Add visual representation for the sound on your site. Users might be unaware that they need to turn their speakers on.

Because most websites do not offer audio, many of the computers in our study (especially those in the home environment) were not set up for audio on the Web. In homes where various family members used the same computer for different purposes, some computer speakers were set at full volume, while others were disconnected. Designers should take these factors into consideration and try to provide users with the most pleasant and easy audio experience possible. There should always be a visible volume control and a mute checkbox. Unfortunately, most of the websites for kids we studied had an abrupt audio start.

UrbanOutfitters.com, although not a children's site, had well-designed audio features. When arriving at the UrbanOutfitters.com homepage, users saw a "radio urban" icon. They can choose to start the background music, and should they start it, they can control it. For kids the visual design for controls would likely be different; however, the visual affordances of the controls should be the same for kids as for adults.
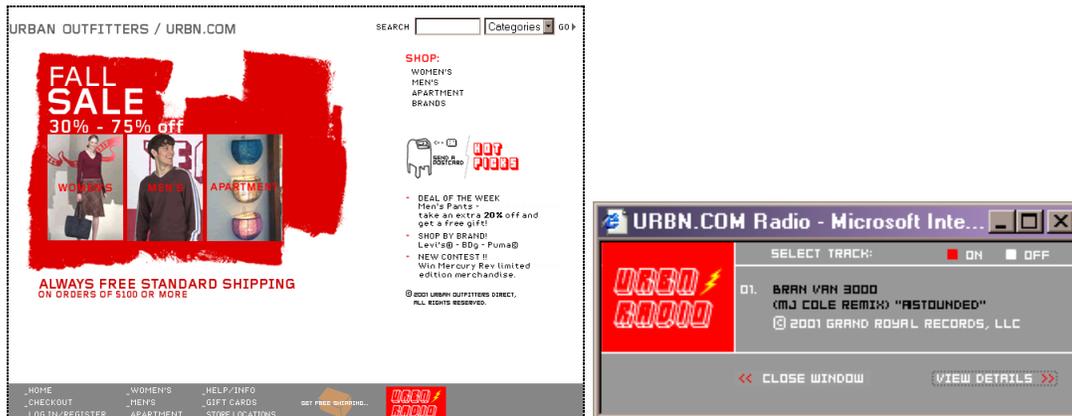
The Urban Outfitters' "Radio Urban" feature gives users audio control.

> 33. **Use music that is popular and familiar to your target audience**.
> Kids get excited when they hear music they know.

On the Bonus website, where the midi file started automatically, kids smiled and some even tapped out the beat with their hands. They reacted similarly on the Playhouse website during some activities that had background music. They seemed more excited when the tune was one they recognized from a TV cartoon. They merrily sang along with the computer (first-grade girls).

Audio Rollover and Sound Effects

> 34. **Use sound to supplement and enhance the interaction**.
>   Do not rely solely on audio rollovers and sound effects for important navigation. Adding audio rollovers provides an experience enhancement that kids enjoy, especially if the sounds are funny.

According to Lepper and Malone's research on kids' computer game preferences (1987), audio effects' correlation with game preference was 0.51. Sound effects were one of the top three elements that proved significantly correlated with preference[16]. Kids preferred the games that had more sound effects.

Sound effects are an additional source of entertainment on Web pages. Our users enjoyed rolling the mouse repeatedly over icons that initiated sound effects, especially when the sound effect was funny and goofy. This behavior almost turned into an activity by itself.

Adding sound effects to visual rollovers (so that moving the mouse over the icons caused both an audio and a visual change) created both interactive feedback and a source of play. On the GameGoo game menu, for example, once users discovered that the little monsters had visual rollovers and sound effects, they tried each one. They pointed the mouse at each creature to find out what sound it made and giggled at the funny sound effects (second-grade girls).

On websites like GameBrain, however, the download time for the entire interface was so long that the addition of sound effects and animation actually slowed down the interaction, worsening the user experience. Users became impatient while the interface items slowly loaded and clicked on anything just to move on.

Big sound files can interrupt the user experience by making the user wait, especially over a slow connection. It's better not to force users who don't want to listen to wait for sound files to download.

Narration

> 35. **Consider using rollovers for narration**.
>   Add rollovers for audio narration and instructions if your target users are unable to read or are in the initial stages of reading. Record short (a few seconds) of clearly audible and understandable audio clips in age-appropriate language.
>
> 36. **Don't depend on audio to explain navigation.**
>   Provide navigation that is independent of audio. The navigation structure and tools on the site need to be understandable to users without audio instructions. Often audio files download too slowly, and users make navigation decisions before hearing them.

On the Alfy website, all icons and navigation toolbars had rollover narration. Rolling over objects in the interface with the mouse pointer caused the name of the category or action to be read aloud in the selected language. Many younger users (first graders) who had high speed Internet access found Alfy's audio narration helpful.

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[16] "Making Learning Fun: A taxonomy of intrinsic motivations for learning," Malone T. and Lepper M., from *Aptitude, Learning and Instruction*, 1987.

*"In Alfy it was helpful that they were talking because I can't read that well." –
(First-grade girl)*

Narration can be achieved in several ways. Websites we looked at had two main
types: rollover narration and click narration.

Rollover narration — Some users rolled over each icon systematically to hear the
text, and others just listened to what they happened to encounter (first-grade girls,
Alfy).

Click narration — Beginning readers were relieved not to have to read a lot of text.
An example of this kind of narration was found on Alfy as well, where most activities
have a narration icon for the game's instructions. For this age group (5–6 year olds)
the narration was a great help in navigating and understanding the various activities
and games.

For some children, however, the sound files only interfered with the user experience,
because they slowed down the interaction and did not provide any benefit. Using the
same website in test sessions with modem-speed Internet access, the beginning
readers never had the opportunity to hear the narration. By the time the audio files
loaded, the users had already clicked on something else on the site and moved on.

Another problem with narration rollovers occurred when users mistakenly rolled over
a general website navigational icon in the middle of a game. Users could not identify
the sound and didn't know why it occurred. They weren't sure how to proceed.
Designers should separate the activity area from other navigational features as much
as possible.

NAVIGATION AND SEARCH

The majority of the websites we examined offered users both browse navigation and
search as ways to find information. Navigation was generally designed in a tree
structure, starting from the homepage, branching out to various categories, and
from there to content nuggets. Search was usually accessible from a search page,
and it seemed to return all instances of the search terms on the site.

Like adults, children chose methods for finding content depending on tasks. Often
when users were trying to find something specific, they used the search box (if one
existed on the site). When browsing with no specific goal in mind, they went to their
favorite category.

The most important factor in user satisfaction was whether users found content they
were interested in. Whether through browsing or search, users' general impression of
the website was defined by getting what they want.

*"A good website is where I found all the information for my school project. A
bad one is where I didn't." – (Fourth-grade girl)*

Kids Navigating Sites Designed for Adults

37. **Use standard navigation and search schemes**. Many kids are familiar with these conventions and use them easily.

Kids were generally familiar with navigation and search schemes on popular
websites. When surfing well-known websites aimed at adults, young users had
minimal difficulties in completing their tasks easily and quickly. Kids used both the

search box and the navigational categories to find the information they wanted and showed no marked preference for either method.

On Amazon.com, users were asked to find information about the latest 'Harry Potter' book. Kids (third and fourth graders) completed these tasks successfully, both by using the search box and by browsing the categories. When using the search box, they simply typed "Harry Potter". From the results displayed, they found the information needed. When browsing, they started from one of the categories on the homepage (for example, "books," "specials," or "kids") and started clicking through until they reached the information they were looking for.
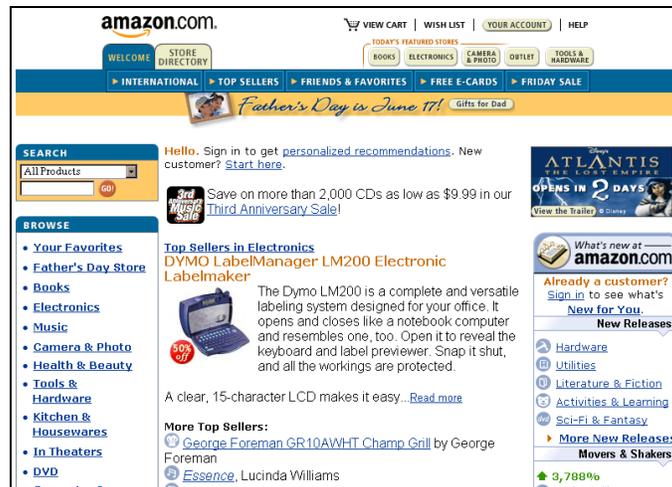
Amazon's standard search and navigation was easy and familiar to kids.

Users were equally successful at Yahoo!, where their task was to find information about math for homework. Although this site was designed for adults, its straightforward and informative design made the kids' interaction satisfying. They easily found the information they wanted, both by using search and by navigating through the categories.
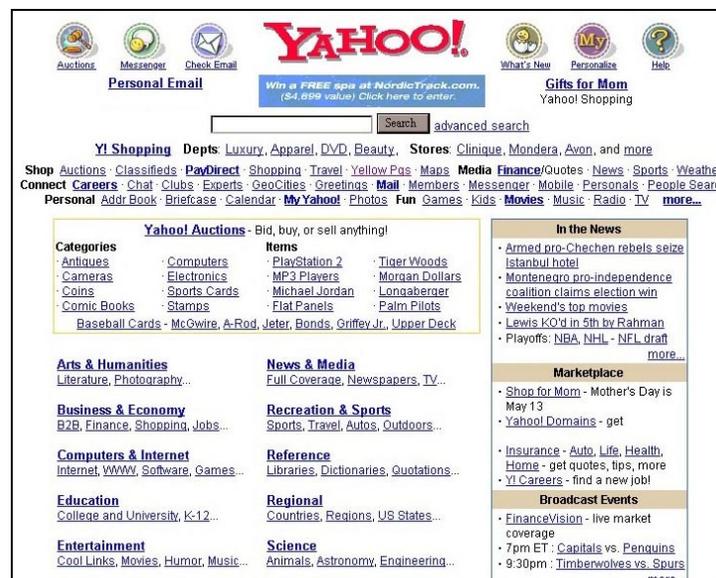
Yahoo!'s straightforward and informative design proved successful with kids also.

Some users said they use popular general audience search engines as their starting page when they look for information on the Web. They use these sites either by themselves or with a parent or teacher. Use standard search and navigation schemes to make the website's content easily accessible. (See also page 21.)

> *"I like the Internet more than CD-ROMs because you can search for the stuff you want." – (First-grade boy)*

Kids Navigating Sites Designed for Children

> 38. **Provide constant access to the search feature**.
> Every content page should have a search box. Inside an activity, there should be at least a link to search available at all times, in a consistent location.

Unfortunately, many children's websites lack a search box. Most of the websites in our study had either a search page with a link from the homepage or nothing at all. Users had difficulty finding content they wanted on these types of sites, especially when they were looking for something specific, such as for school projects, favorite sports, pop stars or other characters. Users became frustrated, and many said things like "this website doesn't have anything," and wanted to leave.

Good search engines allow users to find specific information quickly. Users are satisfied when they find what they want, and they return to the website for more. Search boxes should appear in the same location on every page on the website, so that users know where to find the search capability whenever they need it.

> 39. **Create meaningful category names**.
> Use informative titles for category names, rather than vague or trendy words.

Instead of using straightforward and informative titles, many of the sites for kids we studied used terms that were too general. Category titles on the homepage were vague, using buzzwords and terms designers apparently thought were cool, in an attempt to make the sites appear fashionable and attractive.

Users were confused by these titles. They didn't know what they would find and skipped whole sections of activities. When choosing a category to find content, kids either guessed, often choosing the wrong category or just chose a category at random.

On Bonus, for example, the main content categories were named: *Play, Color*, *Explore*, *New Fun*, and *Imagine.* Users could not differentiate among categories and were unsure where to go to find something that interested them, because the category names were so vague*.*

> *"If 'color' is different from 'play,' does that mean there are no games there? What's the difference between 'new fun' and 'imagine'?"*

Vague category names on Bonus's homepage confused users.

A better example of category naming can be found on Yahooligans!. Although there are many levels of categories on the same page, which could be confusing for some users, the main categories described the content and were placed in a central location. Additional categories describing activities (such as games, and chat) were placed separately. This separation and labeling made it pretty easy for users to figure out where the content and interaction they wanted was located.

The straightforward wording and easy-to-understand categorization scheme at Yahooligans! Helped users locate what they wanted.

> 40. **Design search results to inform users about the website's content structure.**
> Help users learn how to browse your site by showing the relevant content categories for each item in the search results page.

Users' mental models are not always the same as those of designers. This means that the way users organize information might be different from the information architecture on the website. This mismatch may contribute to users' perceiving a category to be missing or an item to be misplaced.

Categories of content are usually presented on the homepage and the site map[17] (if the site has one). Another place to expose users to the website's structure is on the search results page. Because kids use search when looking for something of interest, they are highly motivated to read the entire search results page. When the trajectory or navigation path are added to each item in the search results, users can learn where the information they want is located, and how to find additional interesting items on the website.

A fourth-grade boy who was interested in sports wanted to find related activities on Bonus. Bonus's main categories were "Play," "Color," "Explore," "New Fun," and "Imagine." Because there was no sports category, he decided to use the search. He typed "snowboarding" — his specific interest — in the box. The results page included links to several games related to snowboarding. He concluded that was all the content this site had to offer that was geared toward his interests.
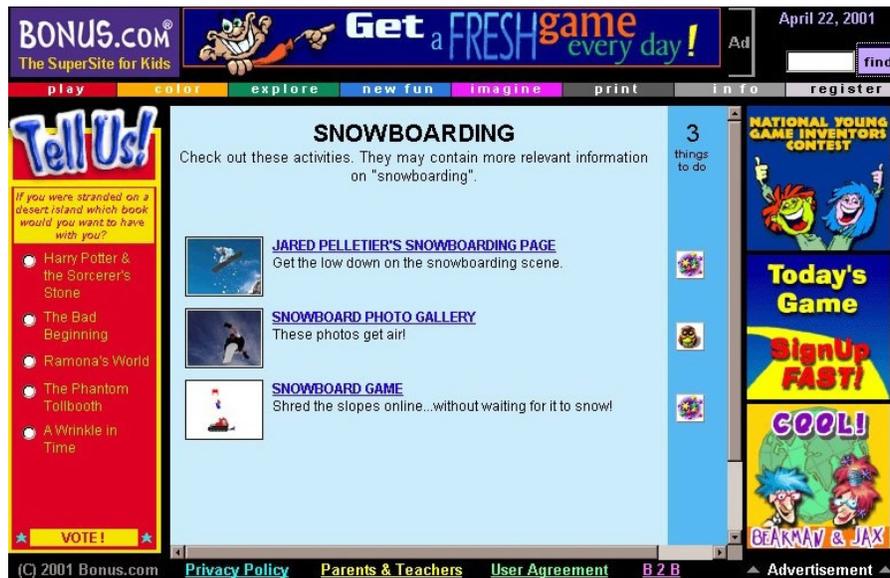
Bonus's search results for "snowboarding" lacked reference to their Sports subcategory.

He never discovered that Bonus had a full-blown sports section hidden in the "Play" category — because neither category was shown on the search results page. Search results that include information about the website's structure give users a more satisfying experience[18].

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[17] For more information about site maps, see our report "Site Map Usability." www.nngroup.com/reports/sitemaps

[18] NN/g, *E-Commerce User Experience*, 2001 http://www.nngroup.com/reports/ecommerce/

Bonus's Play category included a "Sports Action!" subcategory.

Yahooligans! had better search results than Bonus, because it revealed the relevant categories as well as content chunks. Searching for "snowboarding" there returned various types of results on one page. Alongside links to specific snowboarding content and activities were links to snowboard media and snowboarders. There was also a link to the Yahooligans! general sports section. This search results layout offered users a broader view of the desired content available on this website.

The search results page for "Snowboarding" on Yahooligans!

41.	**Do not use more than two navigation levels or schemes.** Too many navigation systems in one website create confusion.

Sesame Street is a very graphically rich website that includes many activities for kids. Our users were excited when we referred them to this website and recognized all the characters from TV. However in all ten of our sessions with first graders, this initial enthusiasm turned to frustration when they were unable to figure out how to get to a game.

We asked users first to choose an activity and play with it and then to find a specific one we chose — either coloring or music. They had to find the activities using one of Sesame Street's navigational schemes. (There was no search feature.)

Sesame Street had a number of different macro-navigation systems.

Sesame Street (above) had several different macro-navigation systems on its homepage:

- **3-D street sign** (left): This navigation system offered both textual links (additional signs) and icons for various sections of content: games, stories, art, and so forth, including sections for adults and a link to the homepage and staging page.

- **An animated icon list of Sesame Street characters** (under main graphic): This system categorizes the websites' content according to the character chosen. Clicking a character icon reveals all the content related to that character.

- **Accessible, redundant textual links** (bottom of screen)**:** These hypertext links duplicate those found on the street-sign navigation image.

- **Graphical banners** (top): These banners promoted mainly Sesame Street features, and therefore looked like additional content to kids (more about kids and banners on page 84).

Sesame Street also has micro-level navigation. After arriving at a second-level category — content by character or by topic — users had to navigate to an activity by using one of two additional *micro*-navigation systems. Inside a category, the various activities are presented as thumbnails inside an element that appears three-dimensional. Two arrows on each side enable scrolling for more activity thumbnails, and little screws on the top symbolize various subsections of content. Sound complicated? It is.

Sesame Street's subcategories had two micro-navigation schemes within three macro-navigation schemes: content sliced by category (games) on the left and content sliced by character (Big Bird) on the right.

First- and second-grade children using this website understood basically how to interact with the macro-navigation schemes. They understood where to click in order to get further into the website content. They did not understand the differences between the navigational systems, however, and when to use which one.

None of these children used the micro-navigation systems. They always chose one of the three thumbnails first presented to them. They did not understand that they could scroll or click for additional selections. When users wanted to look for a new activity, they either chose another one from the three initially presented thumbnails or went back to the homepage.

Websites that have too many complex navigational options overwhelm users, especially visually rich websites for kids. Users have a hard time differentiating navigation elements from visual content. Therefore, the number of navigational schemes should not exceed two. Users must be able to understand the differences between them and when to which. Micro-navigation systems on category pages can be difficult to use when content is hidden, even for adults[19]. It is easier for kids to see all the content at once, grouped according to kind.

> 42. **Do not design interface elements to have more than one intended function**.
> Each interface element should have only one function, otherwise users get confused

Another confusing situation occurred on Sesame Street, involving the bottom navigation bar. This bar sliced activities according to each of the Sesame Street characters. Clicking a character icon revealed all the activities in which that character

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[19] *E-Commerce User Experience*, 2001. www.nngroup.com/reports/ecommerce

appeared. Rolling over the character icons, however, made sounds like a xylophone. Each character had a musical tone assigned to it, so by gliding over the character icons, users could play lovely tunes. In fact when users enter the site the xylophone plays the beginning of Sesame Street's famous tune, inviting users to try it and play more music.

Dual functionality for Sesame Streets' xylophone navigation confused users.

Problems began when users were trying to use one function but accidentally triggered the other. A first-grade girl, for example, became engaged with the xylophone. She was rolling over the popping characters and enjoying the sounds. She then mistakenly clicked on a character instead of rolling over it — and the entire screen changed into a subcategory page. She was surprised and confused at the change, unsure what had happened. She asked us if she had done something wrong.

Confusing interaction negatively impacts the user experience. Users should be able to enjoy the activities offered at a website without feeling they are doing something wrong or misunderstanding it. One way to alleviate this situation is to assign one set of functionality to each item. Interaction modes are an abstract and complex idea, which might not be suitable for young Web users, especially when those modes are hidden.

Obvious Feedback and User Control

Users had another problem on Sesame Street when looking for specific activities; because users couldn't tell when they had finally arrived at the category they wanted. The visual feedback of the navigation was too subtle. For example, when looking for a coloring game, users clicked on "Art" but did not realize when they had arrived; therefore, they went on to click something else.

In Sesame Street's "Art" category, the location feedback was not emphasized enough.

Although there was a title saying "Art Room," users did not see the location feedback and continued to look for the art section. This confusion could have occurred because of the lack of feedback on the navigation structure ("Art" remained clickable, even within that category, and there is no visible difference in the category sign). Also, the many colorful visual elements on the page could have distracted users from the low-contrast title text in the top of the screen.

> 43. **Present noticeable "you are here" feedback to users**.
> Show users where they are in the website structure (homepage, category, activity), and where they can go. Make it easy to understand how to move around within the site.

Website interfaces designed for children are full of visual images. Although lots of images can stimulate curiosity, they can also make noticing important information harder, because so many items compete for the users' attention. Users might overlook content, interactive elements, and navigational features.

In Zeeks' movie-rating section, lack of noticeable navigational feedback confused users. In this section users chose a movie from a pop-up menu, where they could read what other kids wrote about it. They could also submit a personal rating and critique. Although users were excited about this idea, interacting and participating was difficult because of the implementation.

The pop-up menu was hard to click, and once clicked successfully, only a minor change in the interface indicated that users had switched to a specific movie. The changing movie title was located above and separate from the interaction area, next to the banners and general navigation, where it was easily overlooked.

Fourth-grade boys were enthusiastic about the movie-rating section and wanted to find the rating for some of the movies they had seen recently. They clicked on the Movies category and chose a movie from the pop-up menu. They did not notice that the title changed (separated from the review at the top of the page), however, and did not understand why they were not getting the movie they selected. They were there but they just didn't know it.

They tried the same action with different movies, and finally figured it out. If they had not been in a usability session with a specific task, though, these users would have given up without discovering the subtle feedback, and would never have noticed the content they wanted.

When users focused on the pop-up menu in the interaction area,
they did not notice a minor text switch in the title and banner area
("Save the Last Dance").

It is important to give users noticeable visual feedback that they have arrived at their anticipated destination. Separating the movie title from the interaction area created a too-subtle indication that the page had changed, which confused users.

44.	**Do not remove standard navigation tools from the browser window**. Kids depend on these tools and get frustrated when they can't use them to control their web experience.

Kids wanted control over their Web environment. They wanted the option to go wherever they choose, without any restrictions. Some websites had removed standard navigational tools, however, creating a frustrating user experience.

On Bonus, a new window popped up that did not include the browser's standard navigation icons. Instead, the new page offered its own internal navigational system. Some of our users were troubled by the missing browser toolbar, especially when they wanted to click the Back button. This lack of control negatively influenced the users' whole perception of the website.

> *"I liked this site only a little, because it was hard to find the Back button." –*
> *(Fourth-grade boy)*
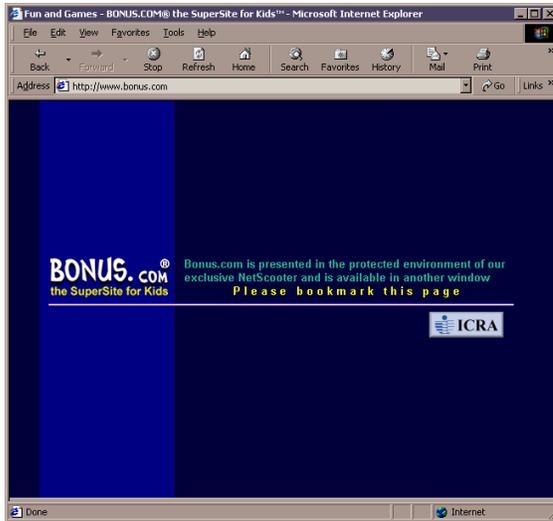
*At Bonus, the browser showed one thing, while the content appeared
in a pop-up window with no standard browser features.*

GRAPHICAL USER INTERFACE

Homepages and Category Pages

> 45. **Present the breadth of the website's content on the homepage,
> to achieve a true initial impression of what the site has to offer**.
> The homepage should give an overview of the website without creating
> any false expectations.

A child's first impression of a website is crucial to the continuing of their stay on the
website. With such a vast number of website choices available, if children are not
sure they will find something interesting on a website, they leave immediately. Users
scanned homepages looking for meaningful images and text. They usually played
around with the mouse as well. If nothing attracted their attention, they wanted to
go to other places to find something that would.

We asked all our users for their first impressions of various websites. Websites that
clearly presented the breadth of their content — in text or pictures — were perceived
as having more high-quality content than websites that used fuzzy initial
presentations.

Good First Impressions

Users reacted positively to websites that presented their offerings concretely. A key
factor was showing the range and structure of the website, so users could easily
identify what interested them, discover what else was on the site, and then go for it.

On Galim, users could determine immediately what kind of content was available and
how to get to the topics that interested them. A series of evenly laid-out, descriptive
icons presented a complete overview of the content and gave simple access to it.

Galim's holiday category icons were self-explanatory
in terms of the content they provided and how to navigation to it.

"In this website you choose a topic, click it, and it tells you all about it." –
(First-grade boy's initial reaction to Galim)

Yahooligans! presented a textual design that achieved the same goal. They used text to list all the content in chunked categories, using minimal visual design. Users said:

"I like Yahooligans! Easy to find stuff, and it looks like they have a lot of cool stuff."

"I think there is going to be a lot of stuff here — many links, many categories."

"I prefer to have all the games in a list — it's easier to find what you want."

Yahooligans! used text to show the breadth of their content offering.

Both Alfy and Disney's Playhouse used a *map* interface metaphor. Their homepages were designed as 3-D maps of an imaginary world, where each object represented a category of content and activities. Although research with adult users has shown this type of virtual environment to be not very useful for navigation, kids found it informative and motivating. They became engaged with the various elements and immediately recognized categories they would like to explore.

> *"Alfy looks like a website you can have fun with; there are a lot of things to do."*
> *– (First-grade girl)*

> *"This is great! There looks like there are a lot of things to do here." – (First grade boy, regarding Playhouse)*

Illustrated maps of virtual environments created curiosity and excitement.

The entire website's interface, particularly the homepage interface, should not be a challenge or a game. Kids want to explore the content, not the interface. When they do not discover or cannot find interesting content, they will leave the site. For this reason, designers should keep the content on the homepage exposed and accessible, enabling users to find what they like.

Bad First Impressions

Fuzzy interface design was the main reason for users' poor first impressions. Websites with vague interfaces offered some graphical and textual content on the homepage, but it was unclear what the content included. Questions came up such as: Are these games? Articles? Chat rooms? Users were uncertain where to go and started clicking around. After a few clicks brought them to places they had no interest in, they wanted to leave the site.

> *"It seems that there aren't a lot of games here."*

Users repeated these statements about websites that, in fact, had an abundance of interactive content. This first impression grew out of lack of exposure to the various possibilities. Users explored the site for a while but still could not find an activity they immediately understood or were engaged by. Unfortunately, these users ended up missing the majority of content available on these websites.

MaMaMedia's homepage presented five different daily attractions. Each game was from a different section of the website (there were four sections in all), and an additional game promotion was presented in the center.

*Users didn't understand the subtle category links
next to the highlighted game icons.*

Users did not understand the underlying structure of the website when they first encountered it. They were attracted to a game icon, but once they finished playing the game, they did not know where to go or what to do. On the various activity and game pages, the navigational features that indicated other possibilities on the website were very minimal and abstract. These five colored circles at the top of other banners were insufficient in presenting the websites' possibilities to first-time users.

*MaMaMedia's visual representation of its navigation and structure
was hard to understand (top left in screen).*

The difficulty in recognizing the categories was compounded by their meaningless names, for example "buzz" vs. "zap." (See also guideline 39.)

Unsure of the next step, some users went back to the homepage and chose another of the five activities presented there. MaMaMedia offered dozens of activities that our users missed.

> "When you go on it for the first time, you can't find many games. But once your friend tells you — it's easy and fun!" – (Fourth-grade boy telling us about his MaMaMedia experience)

On Yoyo.co.il, users entered an even more abstract environment. Three images looking like 3-D structures appeared on the homepage. Two seemed they were for navigation, and the third was content; however there were minimal textual titles so it was hard to be sure. The images on the main structure were animated and constantly changed.

Mysterious objects floated around on YoYo.

> "This site is stupid because there are no explanations…. They just show you something and you don't know what to do. They should add an explanation to each picture." – (Fourth grade girl)

Users tried clicking around looking for content that interested them but gave up after a few failed clicks.

Vague Icons and Titles

46. **Use precise and unequivocal labels**.
    Define and distinguish interface objects by using concrete and plain language, so users can predict exactly what they will get by clicking them.

When labeling an interaction, designers must be precise with the term or image they use. When users don't get what they expect, they feel cheated and become angry, which can undermine their trust in the website.

A common example of this problem occurred with icons and titles for games. "Games" on websites can mean many things; however it usually implies some type of interaction between the user and the computer.

One user clicked a game icon on MaMaMedia's homepage. It was a reading game, in which kids pick clues out of various paragraphs on the Web to solve a problem. The visual representation of this game was a page full of text. The user was disappointed and clicked the Back button immediately, without reading even part of the text.

"What is this game? Where can I go from here?" – (Third-grade boy)

When users expected a game, a page full of text was very disappointing.

On Yoyo's website, a user clicked on the games section and a second-level web page opened with the word "games" (in Hebrew) for a title. No games were available, however. There were some *names* of games listed, but when the user clicked on them, he got only more text.

After a few failed attempts at finding a game, our users understood that these were actually game critiques by other users and not the games themselves. By this time the users were dissatisfied, though, and wanted to find a website that had what it promised.

"I went to this section 'cause it said 'games,' but I can't find any game here! Why did they write it, if is it's not here?" – (Fourth-grade boy)

The games section on Yoyo
actually consisted of game critiques by other users.

Fuzzy Information Architecture

Precision is important not only in icon names but also in the location of elements within the information architecture. When an item or link is placed in a specific section, the user automatically assumes items grouped with it to be similar. As in the MaMaMedia example above, because the reading game icon was grouped with other game icons, users assumed the interaction would be similar and were disappointed when it turned out otherwise.

On Kids.co.il, a first-grade boy was happy to see the coloring section. He had played this game on other websites and had enjoyed it. He clicked on "Coloring" and got to a category page, which presented three coloring options. Two options had images next to the textual link; the other did not. The user chose the last one, which had no image of what he was going to color (see left image, below).

A new page, presenting a choice of pictures, appeared. He chose the rabbit. However, when he finally got to the picture he had chosen,, he found no coloring tools to use. After clicking all over, the disappointed user wanted to leave this website.

It turned out this section of the coloring category was not an interactive coloring game like the other options in the same section. Instead, it was a print-out coloring game. Te difference between this link and the other available links in the coloring section was not communicated effectively by the interface, which confused the user who thought the coloring game was "broken."

(Top) Three icons in the Coloring category;
(left) Third icon goes to this subcategory;
(right) clicking an image reveals a printable outline for coloring by hand,
not an online coloring game, as the other two coloring icons did.
Users were confused by the different interaction outcomes
and thought the game was broken.

Users want to know exactly where they are going and what they are going to be doing. They want to decide what to spend their time on and how to best use that time. Designs that are hard to predict create frustration and mistrust and often result in users leaving the website.

Visual Feedback and Affordances for Clicking

47. **Make clickable items look clickable**.
     Add visual affordances of clickability to interactive images and links.
     Make the distinction between clickable and non-clickable items clear.

Websites for kids often contain a variety of graphical elements, such as small illustrated icons and tools, medium-size illustrations and logos, and full-size pictures. Many children had difficulty distinguishing between active elements (those that can be clicked) and passive images. They looked around to find places to click and sometimes rolled the mouse across the screen. (This behavior is also known as *mine sweeping*, *scrubbing*, or *window washing*.) When an image did not communicate that it can be clicked, it was often overlooked.

Children's difficulty in knowing what graphics they can click on web pages is similar to one of the main findings from usability studies with adult Web users in 1994[20]. During those studies of early websites, adult users frequently did not know which images were clickable or which parts of image maps to click for particular results. For the last several years, however, problems in recognizing what can be clicked have diminished in usability studies with adult users.

This change is probably due to three things: First, websites for adults have dramatically reduced their use of graphics since the early days of the Web. Second, those graphics that do remain are now mainly designed according to conventions for how to indicate clickability and other perceived affordances. Third, adult users now have more experience with the features they can expect to find on websites and the way these features tend to be depicted on websites that follow current conventions.

Those three factors do not apply to Web usability for children, however, because kids' sites are different: First, kids' sites remain colorful and graphics-intensive. Second, the imagery is usually nonstandard in both content and layout. Third, even though children do gain experience using mainstream websites, they still tend to be less-experienced users than adults, and they often cannot transfer experience with features and design conventions from general sites to kids' sites, because the two types of sites tend to support different tasks.

Unlike websites designed for the general audience, websites designed for kids have not yet developed or adopted standard designs that indicate clickable areas of the interface. Perhaps when there are more children's websites and some successful design models, kids will be able to interpret clickability correctly when they see particular graphics and cues.

> 48. **Add simple visual rollovers to images that can be clicked**.
>   Graphic rollovers serve as cues to users that an item is clickable.

For many of our users, getting acquainted with a new website meant moving the mouse across the screen, searching for active elements. Some explored in an organized fashion by going over all the rollovers one by one to discover the various possibilities. Others rolled over random items that grabbed their attention to look for interaction. Children more often clicked the images with rollover effects.

GameGoo and GameBrain encouraged rollover skimming. On GameGoo, rolling over the monsters produced funny animations and sound effects, which users enjoyed. Users of various ages rolled over the small animations again and again, laughing at the noises. When they found an animation-rollover they liked, they clicked it. On GameBrain, users rolled over items to get more information about them (below). This feedback helped users to distinguish between passive graphics (girl) and active items (TV, ghost, and drum).

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[20] The study was conducted by Jakob Nielsen at Sun Microsystems

Roll over green box→

Roll over red box→

*Although we do not recommend that designers rely on rollovers alone,
the kind of feedback used on GameBrain can be important to help users
distinguish between active and passive objects.*

Rollover →

*On GameGoo, even simple, few-frame animation rollovers
distinguished between clickable images and colorful backgrounds.
In addition, this light-weight animation delighted users
by adding a non-interfering entertainment element.*

Note that this rollover recommendation contradicts common usability findings for
adult users, who cannot be expected to sweep their cursors across the entire screen
in a hunt for rollovers. Kids have more of a tendency to enjoy the interface for its
own sake, as well as a willingness to explore the screen, as long as it is easy and
rewarding to do so.

This sort of entertainment element should never come at the expense of the site's ease of use, however. If the site has usability problems, kids will leave the site before they ever get to be entertained.

> 49. **Design text buttons to look pushable**.
>   Make clickable objects three-dimensional, and use that visual cue consistently. Visual affordances that mimic real-world controls are extremely powerful with kids.

In our study, kids did not always differentiate between clickable buttons and static titles. This confusion caused two usability problems: kids clicked on some words that made nothing happen, and buttons with words on them that were crucial to the user experience were not discovered. Both problems created a sense that the website was less professional or simply that it "didn't work well."

The main problem was that clickable interface elements did not have the necessary visual cues. In GameGoo's Skating game, before the users started playing the game they had to choose their "skater name." This task entailed going through four interactive steps, in which users chose and submitted a contributing noun, adjective and number to their future "skater name."
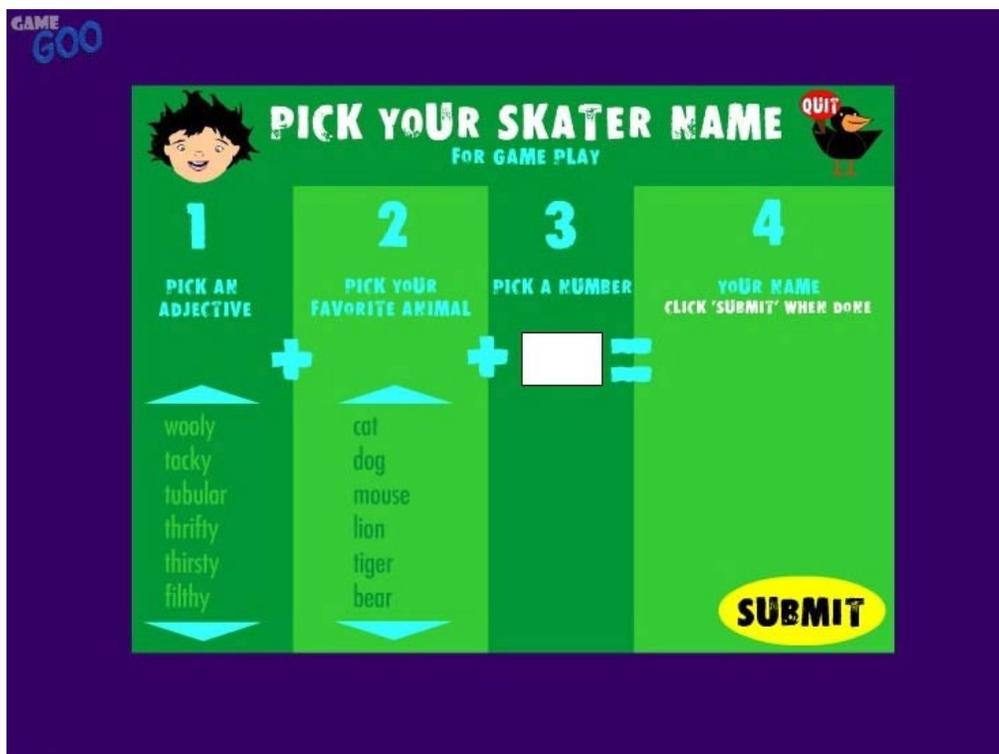
GameGoo confused users with its flat design for interactive items. What can you click here?

Most of the users understood that they had to click on one of the words listed under each step number. However, none of our users figured out they could scroll the list and choose from a larger set of options, because none guessed that the light blue triangles were actually scrolling controls. These scrolling controls looked flat, exactly like the plus sign and the step numbers, which are not clickable.

It also took users some time to figure out what to do in step four. They first tried clicking in the empty space next to the equal sign, and only after a few minutes noticed the "submit" at the bottom of the page. Although the "submit" graphic differed visually from the other items on the screen, it too does not look like a clickable object.

In contrast, on other websites, when these users were unsure what to do, they started clicking on anything that *looked* clickable — usually 3-D objects that appeared button-like. Some of these were indeed buttons, while others were misleading 3-D effects for passive objects. These unclickable elements caused even more frustration than the flat-looking elements that were really interactive.

How does someone know where to click? The answer is that something has to look "clickable." The *perceived affordance* has to be that of clicking. This is a design issue: items meant to be clicked must have the visual affordance of clickability — the look that says "I can be clicked." Similarly, non-clickable items should not have any features that make them look clickable: they should not *afford* clicking.

Logo Links to the Homepage

A good example of users ignoring objects that do not seem clickable is presented by the use of logo icons, which are meant to take the user back to the homepage. During our usability sessions, we asked users to return to the homepage and find a different activity. Most of the users were familiar with the concept of a homepage and had the appropriate mental model of a website. They understood that there is one central place that is a starting place, and that it provides access to new types of content and activities.

A common pattern in Web design is to place the company logo in the upper-left corner of the screen (for sites in left-to-right languages). This location is considered easily accessible and is constantly visible to users.

None of our 55 users clicked the website logo (usually in the top left of the screen) to get to the homepage, however. Instead, *all* users who completed this task used the browser's Back button to return to the page where they started. In one case, a user clicked the Back button 11 times when asked to return to the homepage.

After some prompting and questioning, we realized that the users noticed the logo but did not perceive it as clickable. All the website logos on the 24 websites we looked at were similar to the decorations and banners next to them, and they were flat. Not one website differentiated its logo visually as a navigation feature, or a tool, as opposed to page content or decoration.
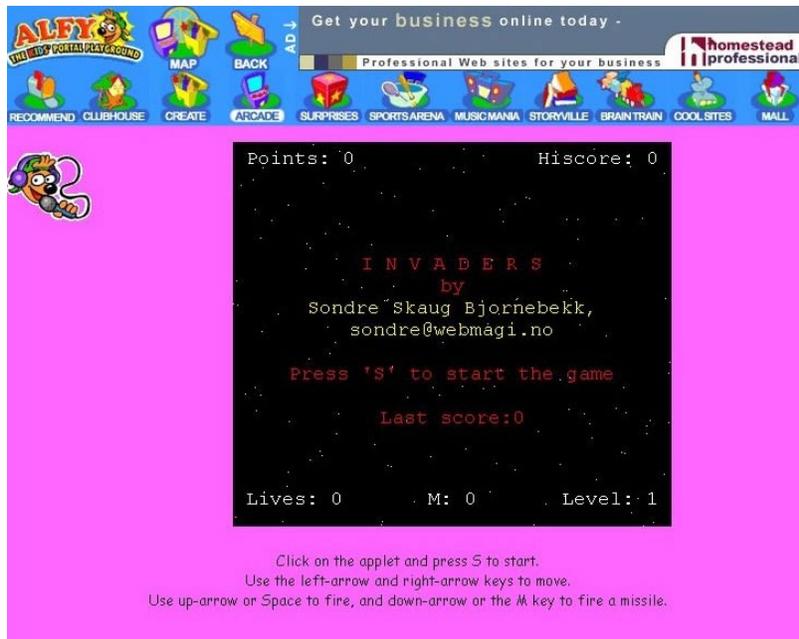
The logo designs at Bonus and Alfy were visually similar to the other items next to them and lacked visual affordances for clickability.
The category icons at least included a text label, but the homepage icons did not. They presented the website's name and marketing tag line, but didn't hint about their interactive function.

At Sesame Street and Wonka, the logo design was part of a navigation element that looked 3-D, which was clearly differentiated from the content on the screen. Unlike the other navigational icons, however, the website logo itself seemed like a decoration on the element rather than a clickable item.
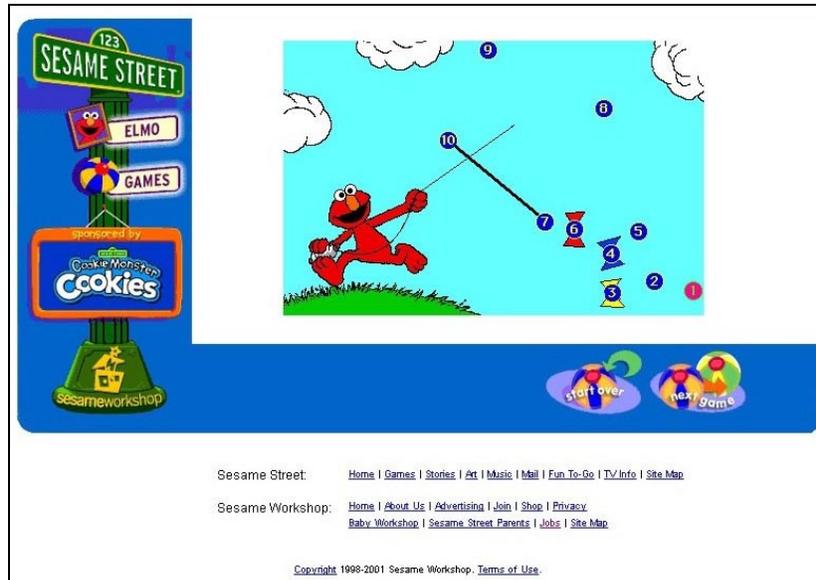
Sesame Street and Wonka Logos looked like part of the background and offered no hint they were clickable.

The top part of the street sign on the left side of Sesame Street's website was linked to the homepage. All the other icons (the lower street signs) had rollovers showing that they were clickable. The top street sign that links to the homepage did not, however.

At Wonka, the letter "W" on the top of the elevator linked to the homepage. Although the other listed objects appeared to be interactive, the letter looked like a decoration on the elevator. None of the users clicked it.

50.	**Beware of promotional elements that are too distracting**. Users might never make it into your website.

Sites often add self-promotional graphics or banners to their web pages, such as links to e-commerce areas or to sibling sites from the same company. Problems arose when the design and location of the promotion grabbed the users' attention and distracted them from the website's content. Kids clicked on the first item that looked cool and weren't concerned if that happened to be a link that led them to a different website.

On Alfy, the problem was not only the distracting self promotion, but also that when users followed it to a dead end, they attributed their poor experience to the whole Alfy website. Alfy incorporated self-promotional icons for their paid subscription website — "Clever Island" within its activities' interface[21]. These icons changed from very flashy to very subtle, differing on every page. Users clicked them all the time — either by mistake, or because they seemed like the coolest activity on the page. All of the users in our study who used Alfy clicked on one of these promotions at some point.
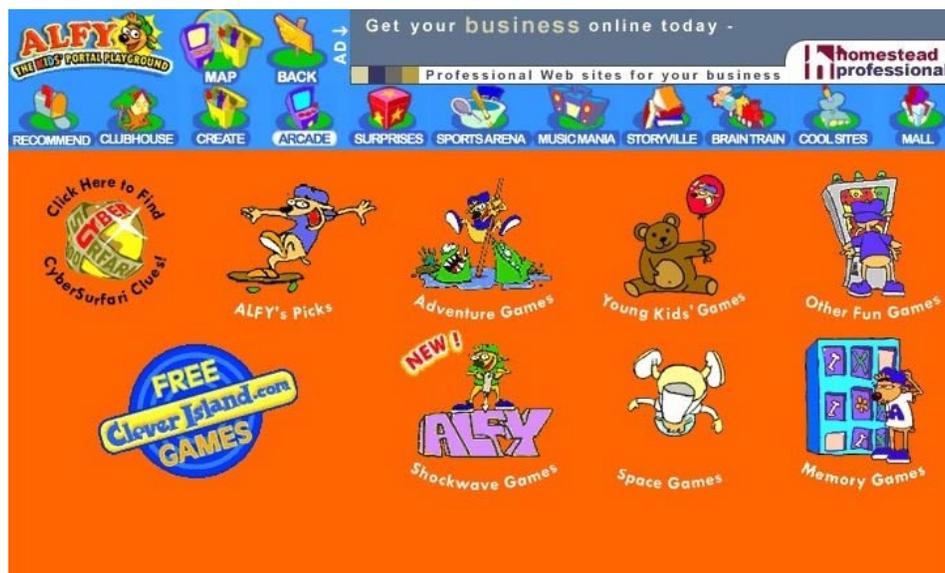
Clever Island's icon was the biggest,
even though it was not a game category but an offsite link.

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[21] GUI = Graphical User Interface

Clever Island again, shown here as the picture in the picture frame.
Kids who were attracted to it soon became disappointed,
because it led to a paid content solicitation aimed at adults.

All this clicking on promotional items sounds like a marketer's dream — but the consequences were quite the opposite. Once users clicked on any Clever Island link, they were transferred outside of Alfy to a page designed for adults. This page had a lot of text and relevant information for subscribing and paying for Clever Island, which was of no interest to the children. They were disappointed and felt cheated, because this was not a game like they expected.

In this case, Alfy's self-promotion encouraged users to leave the website and not come back, even though they were having a good time at Alfy. Not only were they not interested in this page's content, they did not know how to continue. The promotion page had no outgoing links and no mention of how to get back to the Alfy website. Users ended up clicking on anything clickable, finally getting upset and going to a different website.

Although other users in our study relied on the Back button, for some reason these users kept trying to go forward to go out. We don't know exactly why, but perhaps it was the perceived change of website that disoriented users about how to return to Alfy.

"How do you get out of this?!" – (First-grade boy)

A website for parents was hidden within a website for kids on Alfy.

Self-promotional items should look like promotion, not content, and promotional pages should always allow users to get back easily to where they came from. Users should be able to make informed choices about clicking promotional links and to return to where they started.

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51. **Distinguish advertisements from content**.
   Create a visual context for promotions and banners.

52. **Mark the exits**.
   Warn users when they are about to leave the site, and distinguish your content from others. Explain how to return to your website later.

Research has shown that adult Web users have "banner blindness"[22]. This phenomenon occurs as users become more Web-savvy. The majority of adult users does not look at, or interact with, anything that looks like an ad. Kids, however, act differently. Children did not distinguish between banners and content in our study. They clicked banner ads constantly, mistaking them for additional Web content. So, ads on your site are very likely to lead young users astray, usually without them even being aware that they are leaving.

> *"Here is the first game I want to play! It's a Pokémon game."*
> *– (First-grade boy on MaMaMedia, who clicked on a Pokémon banner)*

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[22] 'Banner Blindness: Web Searchers Often Miss "Obvious" Links' by Jan Panero Benway and David M. Lane, Rice University, 1998 www.Internettg.org/newsletter/dec98/banner_blindness.html

Many websites for kids have small text labels that say "Ad" next to banner ads, to signal the link is commercial and not authentic content. This subtle labeling isn't enough, however. Users in our study ignored the text, instead focusing on the ad images. They assumed the link was related to the images, and therefore to additional content. In order to distinguish between commercial ads and content, a stronger design distinction should be made in the page layout and in the design details.

Clearly distinguish between your site's content and external promotions, so users can make informed decisions about when to leave your website. Establishing a different location or appearance for promotions would help users recognize external links. This design solution will still allow users to click the banners of their choice, but with understanding the implications.

There are two "AD" markers on this Bonus page. Can you find them? Users didn't.

Once users have clicked on banner ads, inform them that they are about to leave the website. Websites that we studied did not provide these warnings, and they lost users, who kept clicking on and on, getting farther away from the site they thought they were still on. Users became confused at some point, because they didn't know they had left the website they started with. Some noticed only that the familiar icons were no longer present.

> 53. **Match advertisers closely with your site**.
>   Present only promotions relevant to the site's content and goals,
>   because the ad's content will be perceived as the website's content.

Users in our study assumed that the banner ad content was the website's content. When the banner presented specific brands, those brands influenced users' first impression of the site. In our study, when users saw ads containing content that was not geared toward their age group, they assumed that the site would not interest

them either. On Bonus.com, which had a big banner ad for the movie *Rugrats in Paris* in the center of the homepage, a fourth-grade girl said:

"This site is probably for younger kids and has Rugrats' games."

When placing banners on websites, distinguish them as advertisements, and try to advertise content that will be relevant and useful for your users. Close alignment of content and promotions helps both to ensure users will stay at the site (because they'll perceive it as relevant to them) and to increase the chance of users clicking the banners (because they will be interested in the products).

Distinguishing between content and advertising was extremely difficult on some of the sites we studied. This lack of differentiation can disappoint users and cause them to lose trust when they click on something that looks like content and instead are brought to another commercial site. Zeeks is an example of a website where differentiating between ads and content is difficult.

What is advertising and what is content?
On Zeeks it's hard to tell.

Use of Help

> 54. **Integrate Help with the content**.
>   Most user assistance should be included in the main content of the
>   page. Do not rely only on a separate Help section to inform users.
>   Users sometimes search for information that is in a Help section, so
>   make sure your site search also searches Help content.

Many software and Web studies have shown that adult website users do not use the
Help feature[23]. Rather, they try to click around and figure out solutions on their own,
or they ask someone. This was true for kids in our study as well. Although kids —
unlike adults — did read directions and text, they generally did not click the Help
feature. When kids reached a point where they did not know what to do, they either
started clicking around or just moved on to something else. Some users told us that
when they get stuck at home, they consult the "house Web expert" — either an older
sibling or a caretaker.

> 55. **Explain navigation schemes in the Help section**.
>   Help should not be only about content, because some users look in
>   Help for assistance with using the website features.

The small number of our users who did end up clicking Help often were not helped by
it.

One pair of users who were having trouble on a web page, said that perhaps using
the Help feature would help them figure out how to get somewhere, or what to click.
They looked for information on how to navigate the site. Navigation issues did not
appear in any Help or search results page — which convinced the users even more
that Help is not useful.

Alerts, Dialogs, and Technical Problems

During this study, we encountered many types of system errors[24]. These errors
would pop up either as an alert with OK and Cancel buttons, or worse, a page full of
code would appear (sometimes within a frameset) when a server error occurred and
the real content couldn't be displayed for some reason. Error messages tended to
appear more on older and slower computers, with slower Internet connections, or
outdated software (browsers, plug-ins), and on Macintosh computers.

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[23] One of the many case studies about this topic was published in *Usability Interface*, Vol 7, No. 3,
January 2001, by Avi Parush and Debi Kaporovsky Parush
www.stcsig.org/usability/newsletter/0101-toomuch.html

[24] "System errors" here mean errors originating in the site, network, hardware, operating system,
browser, or scripts, as opposed to user errors or mistakes.

> 56. **Don't assume users have any technical understanding**.
>   Don't assume kids know subtle conventions, such as the difference between OK, Close and Cancel.

Most of our users did not read the error messages. They automatically closed the window or clicked on the OK or Cancel buttons. We didn't find any systematic behavior triggered by a specific design element. Users said they did not know the difference between using Close, OK and Cancel. They clicked on whatever they were used to or had seen others do.

After the error messages appeared, we asked users — "What was that? How do you know what to do?" Our users said things like: "that's some kind of error message", "it happens a lot", and "you just have to ignore it". According to them, the best thing to do is to close the window and find something else.

> 57. **Minimize the potential for technical errors**.
>   Decrease the number of errors and error messages. Users lose patience and appreciation for the website when they experience errors.

By allowing bugs and technical errors, websites are slowly but surely losing their users. Users did not return to an activity that had a technical error, and after a number of errors, they wanted to leave the site completely.

> 58. **Use terms that non-technical users understand**.
>   Kids do not understand technical terms such as plug-in names and connection speeds.

A small portion of our users tried to read the text in the error messages. One of the users (first-grade girl) said she tries to read it, and if she does not understand it, she calls her mother. If her mom is unavailable at that moment, she waits or just goes to another website. In both cases, her user experience has been worsened.

Users in our study were unfamiliar with technical terms they encountered during their Web browsing. Software terms, names of browsers and plug-ins, speed of connections and types of devices meant nothing to them. When kids saw these terms, they usually ignored them. Some websites forced kids to make a decision by asking questions using some of these terms. When confronted with unknown technical terms users either chose randomly, or clicked the Back button.

If the random click took them where they wanted to go, users stayed on the website. If their arbitrary choice had an unexpected or undesirable result, users left the website.
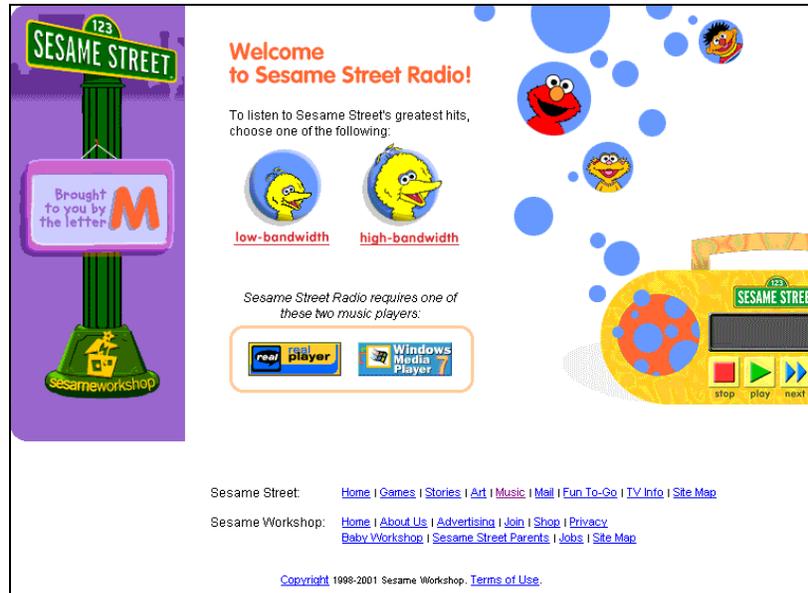
*Sesame Street prompted users to choose their bandwidth,
even if they didn't know what bandwidth is.*

In one of our user sessions, two second-grade girls were trying to view some video clips on a website. After clicking the relevant content link, they were presented with a selection list of connection speeds to choose from. One user thought that 56.6 (which was the connection speed) meant that the movie was 56.6 minutes long, so they decided not to download the video because they thought the movie would be too long to watch.

59.	**Do not offer to change the user's settings permanently with dialog boxes, pop-ups, or alerts.** Customization can undermine trust when it's done without user understanding.

In a small portion of the websites we tested, we stumbled upon features designed to customize the user's computer settings. These features appeared as a link to 'add to favorites," or an icon to add to the desktop. Users did not use these features and rarely noticed them.

A problem occurred when this kind of customization feature was presented in a pop-up window. As mentioned in the earlier section, users automatically clicked the OK and Cancel icons without reading the pop-up text. Usually this kind of automatic behavior had little impact on the user experience. On the kids.co.il's homepage, however, automatic user reactions proved disastrous. Once users got to kids.co.il homepage, a small pop-up message appeared suggesting that the user make this page the browser's default start page. Users had two options: "Cancel" in orange and "OK" in green.

All six of the users (first and second graders) who used this website in our study clicked "OK" without reading the text and ended up changing their parents' or school's browser configuration without knowing they had done so.

This kind of accidental change could seriously violate trust, because an adult using the computer later (for example, at home or at school) might feel that the website invaded their privacy, and therefore not let their kids visit the website again. When adding customization features, make sure they are located where they will be read and understood (or where kids can ignore them), otherwise the customization might backfire.

This automatic customization pop-up on the kids.co.il homepage backfired, because children who clicked OK simply to continue did not realize they'd just changed their default homepage.

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60. **Design interactive dialog boxes so they will not be dismissed automatically**.
Examples: pop-up windows, error messages, download alerts, and customization alerts, which ask users to make a real choice, should be phrased in language and terms users understand.

Users might look at alerts if they differ from conventional dialogs. Using images and design to make alerts stand out may help them attract users' attention enough to actually read them and complete the necessary steps.

Use age-appropriate language and simple design, so users can more easily react appropriately to the alert and make an informed decision. Make the names on the buttons reflect the actual choice, rather than using "OK" and "Cancel." For example in the kids.co.il case, a button that said "Change my start page" and another that said "Don't change anything" would present the choice more clearly than the current paragraph of explanation and use of default buttons.

> 61. **Accommodate a low-tech audience**.
> Do not use nonstandard or recently released features (such as plug-ins) in your design if your users probably don't have the necessary software installed.

Many of the websites we tested used QuickTime, Flash, and Shockwave, all of which require users to download, install, and periodically upgrade software. Participants in our study were not familiar with all of the software names and computer terms presented on some of the websites. Further, some who knew the terms were not allowed to complete downloads by themselves.

Websites in our study exhibited many plug-in problems and incompatibility issues. Lack of software was indicated and handled in several different ways:

- An error message explained that the player could not be found.

- A dialog box or page asked users if they wanted to download software.

- A no-entry page told users to download the plug-in or leave the activity.

- A few sites used auto-detection to hide the dilemma from the user.

Users did not read the text in the pop-ups. They ignored it and still expected to be able to play the interactive game. After a few failed clicks, they left the website.

In one of the schools where we conducted this study, the Macintosh computers did not have Flash installed as a Netscape plug-in. Users had to download Flash for some of the websites we tested during the session, which was a hassle. Not only was it complicated, it is also forbidden to download and install new software from the Internet in many schools (and homes), because of the risk of downloading dangerous software or limited hard-drive space.

At Wonka, a special page asked the users if they had Shockwave, then presented them with three options: If they had the plug-in already, they could go ahead and play online. If they did not, they should download the plug-in first, or they could download the game to play it (without Shockwave).
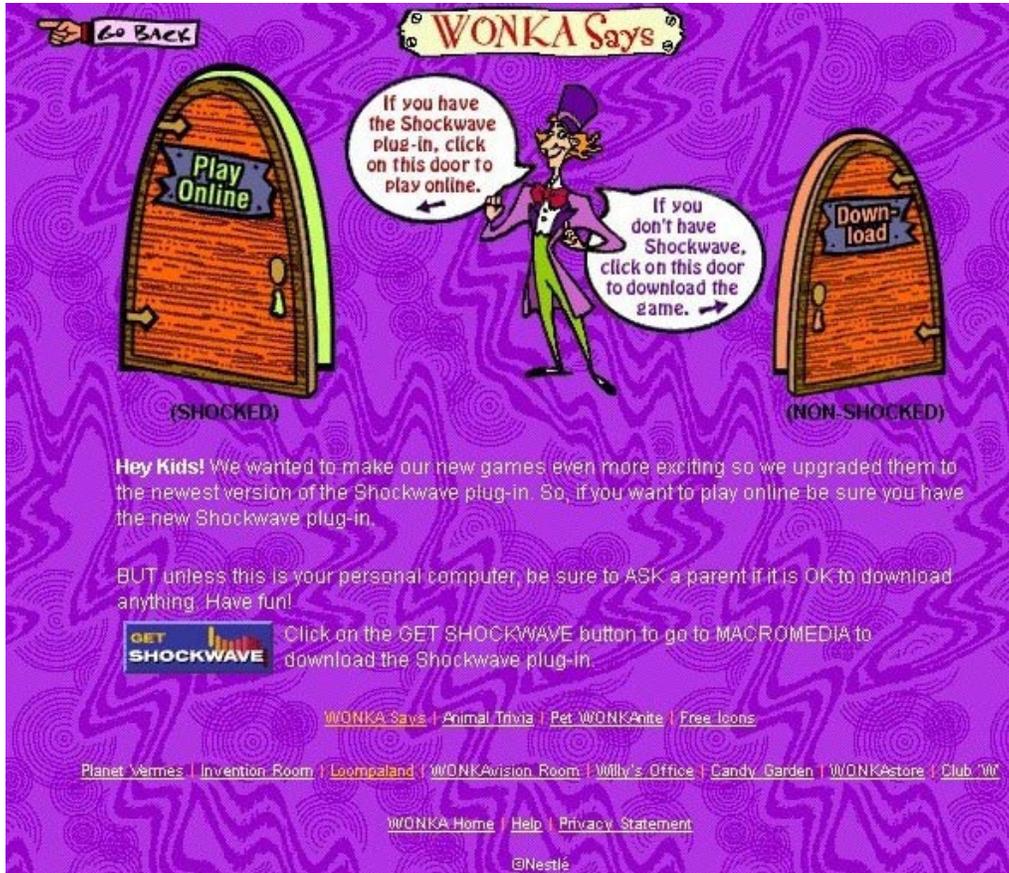
This set of manual choices for downloads puzzled users at Wonka.

Users tried to read the text on the page and had mixed reactions. One user said he did not know what Shockwave was, but he thought he had it. Another user said that her mother does not allow her to download items from websites. A few users had no clue what the page was talking about and clicked "Play Online," got another error message, became discouraged, and left.

> 62. **Automatically detect the presence or absence of plug-ins.**
>   When that is not possible, design the entry page so it will be easy for the user to understand which option they should click to continue.

Research the types of software your users have and use. Selecting the right plug-ins for your users is crucial to their experience of your site. If you decide to require a plug-in, use automated processes to detect its presence and compatibility with the version you require.

If users lack the adequate plug-in version, direct the browser to a usable version of your site for their technology state or explain why it's impossible for them to enter and present alternatives. Because automatic detection can fail under some circumstances, allow users to choose to attempt your site even if your detection tool indicates they might not have the right technical requirements.

If automated and reliable detection isn't possible, create a manual detection page. Using the Wonka page mentioned earlier as an example, instead of asking users to understand what Shockwave is and to know if they have it, create a visual representation using Shockwave. Ask users to click one option if the image in the

door is moving, for example (meaning they have Shockwave), and click another option if it isn't moving (meaning they do not have Shockwave). Don't use a technology that is not required for your site to test for a required technology. For example, don't use JavaScript to detect Flash, when your site requires only the Flash. Instead, use Flash to detect Flash.

> 63. **Provide alternative content for users lacking necessary plug-ins**.
> Add an explanation for users who do not have the necessary software and offer them alternative content.

Explain to users who do not have the necessary plug-in what has happened, so they won't mistakenly believe the website is broken. In addition, always supply alternative content for users who lack the necessary software. Try to make this transition as transparent as possible to avoid making users feel they got second best.

CONTENT

Targeted Content

> 64. **Research your target users' contemporary interests and match your website content to those interests**.
> Present content that relates to the current trends in your users' age group generally, and aim for your target users' interests specifically.

Content plays an important role in users' attitudes toward websites. The topics addressed on a site, and the depth in which they were presented, had a huge impact on the user experience in our study. On many kids' sites, content is organized by categories and types of interactive activities, while on other websites, content encompasses in-depth articles, audio clips, and movies.

Users knew exactly which content was hot (for them) and what was not. They had immediate reactions to content they found interesting or boring. When approaching attractive content, users were enthusiastic, and delved deeper to find out more. When content seemed unattractive, users' enthusiasm appeared to decrease, and any other negative factor became a good excuse to leave the website.

We asked our users "How do you decide where to go on a website?" The common answer from all ages was: "*look around and see what's interesting.*" However, that "interesting" content varied greatly among the various age groups and genders.

Attractive or interesting content combines:

- general kids' trends
- specific kids' trends
- high-quality presentation of content.

General kids' trends are topics and brands that rule the kids' media market. *Harry Potter, Pokémon*, dinosaurs, Britney Spears, and other interests were themes that every kid (grades 1–4) associated with being cool during of our user sessions.

Specific kids' trends are fine-tuned to segments of this population, by age group, gender, local community, or any other affiliation. Certain athletes, latest edition Barbie dolls, and new Disney characters are a few examples.

Finally, the *visual presentation of the content* greatly impacts the initial attractiveness of the content. Kids notice production value and contemporary design, and they make decisions influenced by these aspects.

Children were very specific about what they did and did not like. They made age distinctions sharply. Using content and presentation cues, they immediately determined whether a website was intended for them or for younger or older kids. They referred to content designed for kids even one school grade different from them as completely not for them.

> 65. **Address your users' age in a direct manner**.
> Simply indicate which age group the site is for. For example, provide entrances (and features) for each age group, or explicitly state the targeted age group for your site. Use images, design and content that convey suitability to their age group.

Users were highly aware of current pop culture, from Rugrats to WNBA. They addressed branding in their initial impressions of websites with statements such as:

"This website looks like Nickelodeon and Disney mixed together."

After glancing at a websites' branding and visual design, users expressed strong opinions regarding the age groups for whom the site was designed. For example, on Alfy and Zeeks, the cartoony visual design cued users that those sites were aimed at users younger than them.

"This website is for babies, maybe four or five years old. You can tell because of the cartoons and trains." – (First grader, about Alfy.com)

"This website looks like it's for younger kids — maybe seven, eight years old — since it has cartoons. Websites for kids my age have real people in them." – (Fourth grader, about Zeeks.com)

Cartoons on Alfy and Zeeks signaled content was meant for a certain age group

Research your users' interests in pop culture and current content trends. Learn what they perceive as attractive and unattractive. If your site doesn't have attractive content, at least eliminate unattractive content — things that users immediately recognize is not for them — which could make kids leave the website before even trying it out.

Children are not looking for the lowest common denominator. On the contrary, compelling content unavailable through other means intrigues them. Interesting content and interactivity may sometimes increase kids' tolerance for other usability problems. When users in our study felt the reward was worth the effort, they put up with a site longer before indicating they wanted to leave.

On Yahooligans!, for example, fourth-grade boys stumbled upon the online multiplayer games. In this section *checkers*, *tic-tac-toe* and *go fish* could be played in real time with other kids from around the world. The system's interface was difficult even for advanced users, however, because it included complex tables of clickable text and expert terms.

The boys were extremely excited with the idea — *"Wow! These people from all over are playing this with us now!"* They tried playing tic-tac-toe by clicking on things that appeared interactive, but could not figure out how to play. After seven minutes we stopped them, because they still hadn't been able to figure out the interface and play the game, and we had to continue to other websites. They were still highly motivated by the concept, however. They said they would come back again and figure it out, because:

"It's "fun and challenging to have other real kids play online with us." – (Fourth-grade boys)

*The online multiplayer tic-tac-toe on Yahooligans!
had high-quality interaction but a complex interface.
Users were motivated by the unique content to stay longer and figure out how it works.*

> 67. **Keep content current**.
>   Users expect websites to be updated frequently, in terms of both content and design.

Today's kids are accustomed to having access to constantly updated content. Whether on TV or in school, the content in their lives is relevant to current events. Kids expect to find references in the media about news and holidays, for example, and are pleased when they do. A current reference indicates that content is up-to-date and thus relevant to them. When users did not find these references, their reactions varied from surprise to disappointment.

We conducted some user sessions during the December holiday season, for example. Many users mentioned that they liked how some websites looked "Christmassy" when the homepage reflected visual elements of the seasonal atmosphere.

Wonka's Halloween decor
emphasized its new and timely content (in October).

A number of fourth graders were disappointed when other websites they encountered lacked some representation of the current holiday themes.

> *"This is probably an outdated website since it doesn't show that it's Hanukkah now." – (Fourth grader from Israel, about an Israeli website for kids)*

Characters

In our sessions we encountered a well-known fact — kids love characters. Users were excited about almost any object that appeared to be an animated being. Users spoke to the characters, and the entire website became the background story for the character.

"We like this site because it has nice pictures and a face with eyes and mouth."
– (First-grade girls about Playhouse.com)

The Playhouse landscape was full of animated characters.

The younger users showed the most enthusiasm for characters. Both first- and second-grade boys and girls profoundly enjoyed encountering them. Even greater enthusiasm was demonstrated when the character was familiar to them from other media: books, TV, and toys. Kids were very excited to see these famous characters and acted as if they were meeting old friends.

Characters that users could identify with motivated them to continue exploring the website. When the characters seemed to be their age, or had a feature in common with them, users connected with the characters.

"Alfy is cool! He has a skateboard like mine!" – (Second grade boy)
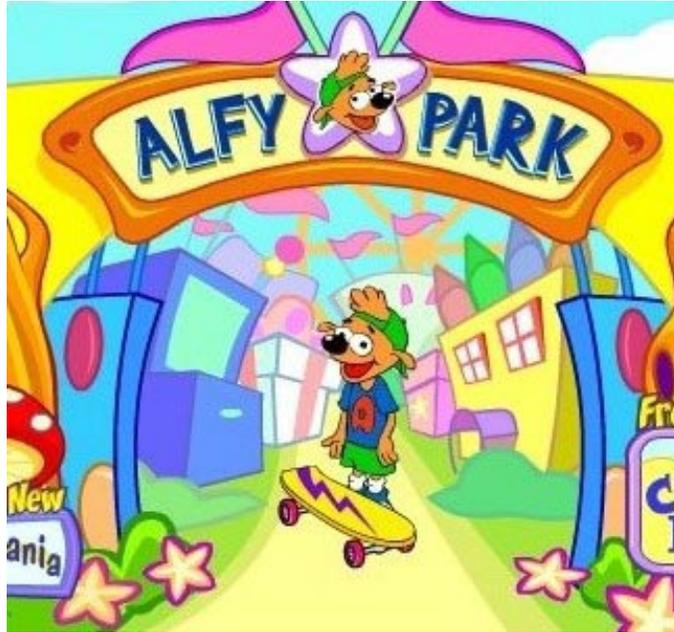
Kids identified with Alfy.

> 69. **Allow users to control or interact with characters**.
>   Kids enjoy the ability to influence various characters, and will seek out all the ways they can interact with them.

The more users interacted with characters, the more engaged they became. Even when interaction was minimal, controlling characters' actions was a great enhancement to the user experience.

On Kids.co.il, a family of characters appeared on every page. The pages were not automatically animated (except for the Flash intro on the staging page). When users rolled over a character, however, it moved and made a funny sound. Kids loved this activity, they laughed aloud and rolled over the character icons again and again, slow and fast.
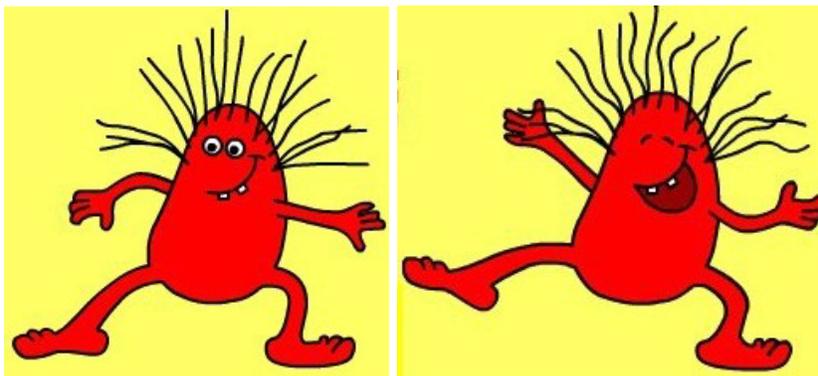
Two-frame animations got big laughs on kids.co.il.

> 70. **Have characters address the users directly**.
> Allow characters to speak to users and create an opportunity for conversation.

Create opportunities for kids to interact with characters. Users feel empowered when they can click, roll over, and control characters onscreen. 'The interaction between characters and users can work both ways. Users enjoy both influencing on-screen characters and having characters address them or ask them to perform tasks. Children followed instructions, but they did so even more devotedly when they were instructed by an onscreen character.

For example, on Sesame Street's staging page there was an introductory Flash movie, where Sesame Street characters, each in its own style, greeted visitors. At the end of the movie, the user is prompted to click the Flash window to continue to "go to the Sesame Street homepage."

Elmo demonstrated the finger warm-up exercise
on Sesame Street's staging page.

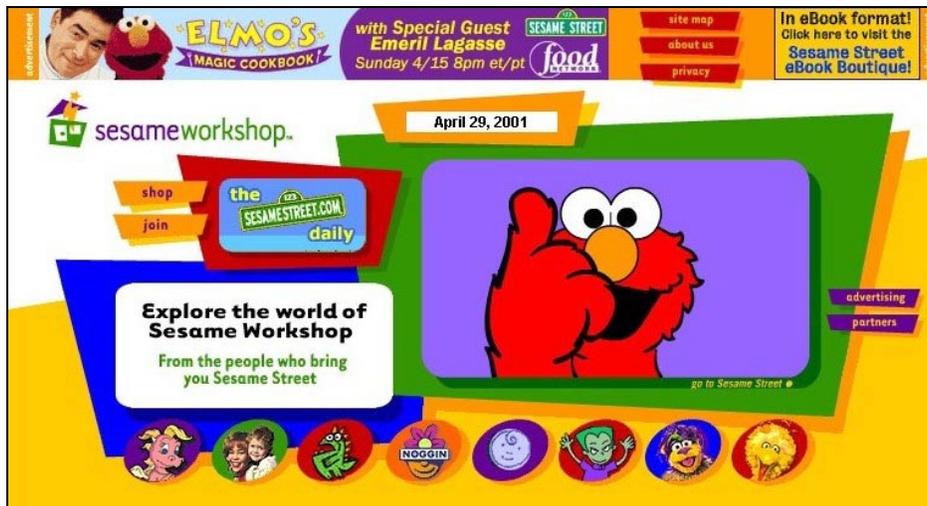During our study sessions with first graders, the Flash clip featured Elmo. Elmo appeared and spoke directly to users as he does on TV. He greeted them and then asked them to join him for a "warm-up" before they entered the website proper. This warm-up included two "exercises" — one for the finger (up and down) and another for the mouse (forward and backward). Elmo spoke to the users, and like every other video-exercise instructor, led the users through the exercise and encouraged them: "Fingers up! Fingers down! Fingers up! Fingers down! Good work!"

All of our users reacted to Elmo immediately, joining him in doing the exercises. They held their fingers out in the same way he did and followed his directions — up and down, up and down. Some users did this overtly, looking at the facilitator to see if she was doing it as well. Other users did this covertly, timidly hiding their hands from the facilitator — under the desk or on the side. *All* users complied with Elmo, however.

In this unique situation, a combination of factors contributed to users' complete obedience. First, Elmo was well known to them and they trusted him. Many watched Sesame Street at home with their parents. Second, asking children to join him was a common behavior he often exhibited on TV; so this action was familiar to them. Kids

didn't care if their character was delivered in a book, on TV, or by computer — Elmo was still Elmo, and their interaction with him remained the same.

Because young users respond so well to characters and pay close attention to them, characters can be a very effective means by which a site imparts messages to its visitors. Allow characters to transmit important information or to create immediate relationships between the characters on the website and users.

Kids and Technology Today

FROM NICHE TO MAINSTREAM

Children play a major role as the generational mediators for today's technologies, which they are growing up with and therefore take for granted. They are used to constant changes and may even think something's wrong when there are no new developments for a while. The children of today do not use technology for its own sake. They choose to use the Web when the experience seems worthwhile and when it beats other options.

In our study we asked parents of our participants to answer questionnaires regarding their children's use of technology. Parents of 41 kids participated[25], including kids grades 1 through 5. There were 14 younger kids, aged 5–7, from first and second grades; and 27 older kids, aged 8–10, from fourth and fifth grades. The participants consisted of 23 boys and 18 girls; 22 were American users and 19 were Israeli.

Kids' Tech Environment

Children are exposed to many technological devices. They use them to play, to access content, and to communicate with their environment. According to a national poll released in June 2000, 48% of all American families with children between the ages two and seventeen have a TV, VCR, video game equipment, and a computer in their home. In addition, the spread of Internet access has been described as nine times faster than that of radio, four times faster than the personal computer, and three times faster than the TV[26].

Children between the ages of eight and sixteen have a variety of media and tools in their bedroom: 57% have a TV, 39% have video-game equipment, 20% have a computer, and 11% have Internet access[27]. In our study, 37% of the participants used cell phones as well.

Although playing video games remains the most popular activity, many more boys have video games than girls. Children spend an average of five hours and 29 minutes every day, seven days a week, with media for recreation (TV, music, books, VCR, computer and video games)[28].

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[25] This number is different from the number of kids who attended our user sessions, because we had some users that did not fill out surveys, and some participants that only filled out surveys.

[26] "Falling through the Net: Defining the Digital Divide", National Telecommunications and information Administration, 1999.

[27] "Media in the Home", Emory Woodward and Natalie Grindina, Annenberg Public Policy Center of the University of Pennsylvania, 2000. www.appcpenn.org

[28] "Kids & Media @ the New Millennium", Kaiser Family Foundation, 1999.
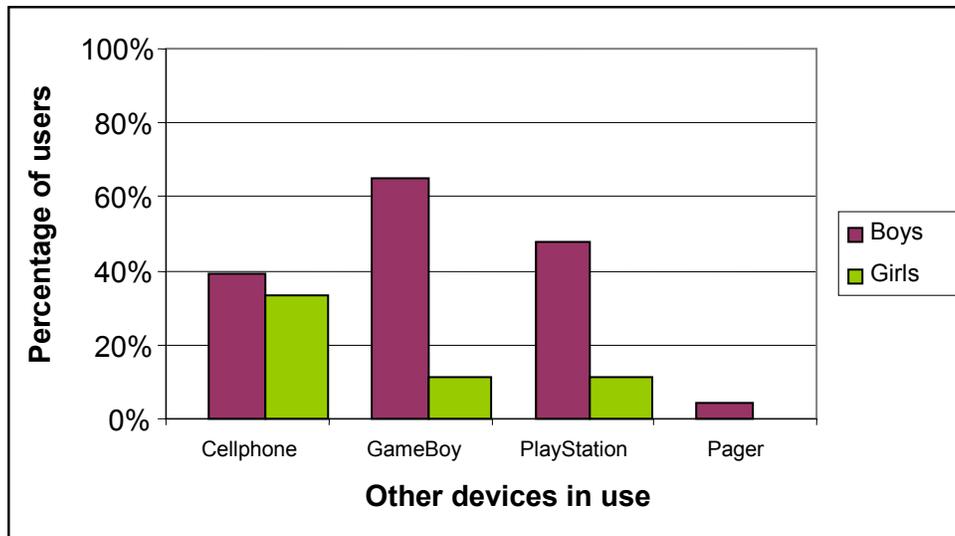
Technology kids used in addition to the computer (from our survey)

As mentioned previously, kids usually do not have access to expensive, cutting-edge technology as do people in the business and professional sector. They use computers that have been handed down by parents and siblings. The computers at schools are often donated and tend to be older models with slower connections. Kids do make cutting edge *use* of technology, however, and lead the way in new approaches to the incorporation of technology in our lives.

Each technology that today's kids adopt will become a trend in the general public in years following. Kids are developing new ways to use technology in almost every aspect of their lives.

Family: Many parents have purchased cell phones for their kids, for safety reasons. This tool allows them to know where their kids are and allows the kids to contact their parents in case of an emergency (or just to ask parents to pick them up from school). Kids now can call when they are in transit to say they're late and can be constantly connected to their peers and parents.

School work: Homework habits are changing tremendously as children conduct research on the Web, write papers on a word processor, and make PowerPoint presentations for class. By autumn of 2000, 98% of public schools in the US were connected to the Internet. In addition, in the year 2000, 54% of schools in the US made computers with Internet access available for students before and after school[29].

Regardless of computer use in class, many kids do a big portion of their homework on the computer. Activities such as going to the library, using a physical dictionary, and other common learning practices are changing their role. To some kids, this is just the beginning: they use video, digital images, and even simulations to enhance their homework.

Friends: Communication with friends is going in new directions with instant messaging, pagers, and cell phones. New jargon and new communication habits are replacing the land-line telephones and yelling from the window. Kids can be seen

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[29] "The Internet and Education," Pew Internet & American Life Project, 2001. www.pewInternet.org

talking on the "regular" phone, messaging on their cell phone, and communicating in a chat room simultaneously! (And of course watching TV the same time….) This communication aspect of technology is more dominant with teens and tweens, as the socializing plays a more important part in their lives.
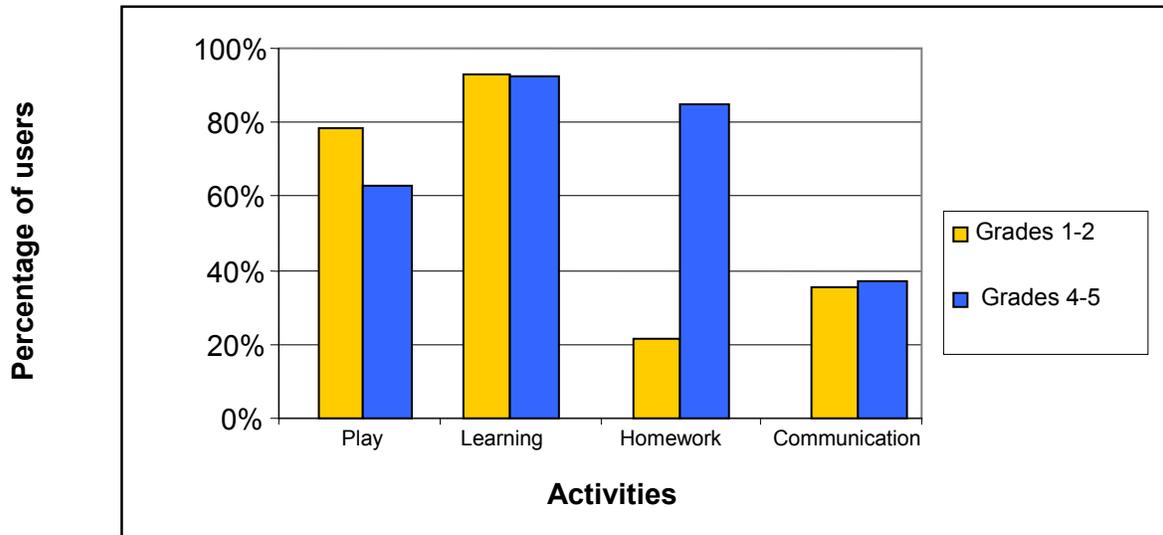
Activities kids perform on the computer (from our survey).

According to our survey, most kids (93%) used computers primarily for play. Content activities included homework (63%) and extra curricular learning activities (68%). Only about a third of our participants (37%) were using the computer for communication.

Our survey shows that on average, kids in grades 1–5 do not currently prefer doing homework on the computer to traditional methods. When it comes to playing preferences, however, kids in our survey preferred playing on the computer over traditional play, especially boys. Other activities, such as online shopping, were still considered off-limits for kids and therefore were not substantially used more than traditional ways. In other studies regarding tweens and teens, however, most (94%) of online youth 12–17 years old say they use the Internet for school research, and more than three-quarters (78%) believe the Internet helps them with schoolwork. A majority of online teens' parents (87%) also believe the Internet helps students with their schoolwork[30].

Technical Understanding

Even though kids use a given technology, they don't necessarily understand it technically. Like most adults who don't understand how a refrigerator works, kids do

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[30] "The Internet and Education," Pew Internet & American Life Project, 2001. www.pewInternet.org

not feel they need to understand the underlying mechanisms of the Web before using it. Many of children's learning experiences with computer technology are bottom–up, through trial and error. They start clicking and looking around, and if this results in a good experience, they'll go back for more.

Kids do not distinguish among various suppliers of the user experience. Hardware manufacturers, software designers, Internet service providers, and content distributors are all inseparable in their perception. When one factor falls short — it reduces the entire experience. Often, bad experiences are attributed to the wrong factor. Kids told us they didn't like websites because they were "too slow" or that they loved the Internet because it had all the sports games results. These kinds of generalizations emphasize the importance of making websites more usable and less reliant on cutting-edge technology that may be absent or break. Then, kids can address the websites' content and purpose and not their technical and navigational performance.

PATTERNS OF USE

Early Computer Use

According to our survey, kids started using computers at age 4.8 on average. Girls on average started using the computer eight months earlier than boys. A noteworthy difference can be seen with the starting age of younger kids to that of older kids. Although kids currently in fourth and fifth grades started using the computer on average when they were five-and-a-half years old, kids currently in first and second grades started using the computer before their fourth birthday. Thus, the starting age for computer use dropped rapidly, by 18 months over a three-year period (1998-2000).

Children usually did not use the Web at this very young age. Their initial interaction with computers was sometimes via specialized kids' input devices, and sometimes not. They mainly interacted with CD-ROMs and other off-the-shelf software. This early exposure to the computer makes it very familiar and accessible. Kids grow up thinking of the computer as just one of the devices they use to enjoy content and have experiences. Kids start accessing the Internet, usually with other family members, around the time they start elementary school.

A two-and-a-half-year-old boy is fully engaged
playing his favorite CD-ROM game.

Technology in Everyday Life

On average, our participants used their computers almost every day. Although boys tended to use the computer a bit more than girls, and older kids (grades 4–5) a bit more than younger ones (grades 1–2), these differences were not significant.

Many kids were independent when it comes to everyday computer use. According to our surveyed parents, 44% of the children usually use the computer alone. Using the computer with parents was also quite common, as 26% of our users did.

This group activity creates a positive perception of computer technology, because it is related to quality time spent with family. Working, playing, and researching together on the computer re-purposes "the computer as a vehicle for building, rather than an obstacle to, family cohesion[31]".
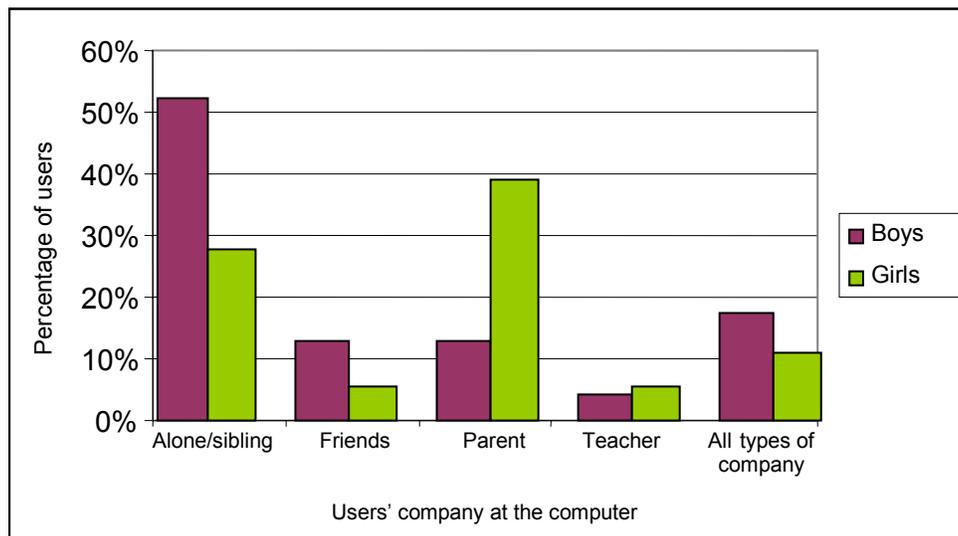
Who kids use the computer with (from our survey).

Girls tend to use the computer with their parents more than boys, and so do younger kids (grades 1–2) as opposed to older kids (grades 4–5). Boys used the computer more with their friends for play than girls, however, and so did younger kids.

These patterns are a snapshot in time (end of year 2001). They will probably change over time, according to the adaptation and incorporation of computers in children's lives. Some of the gender and age-group differences could be caused by social factors such as traditional roles, which may also change over time.

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[31] Seymour Papert, "The Connected Family," 2000.

Comparing Usability for Kids and Adults

There have been numerous user studies in the past few years that looked at various kinds of user experience on the Web. These studies focused mainly on adult users and their interaction with the Internet's commercial interface. Various groups may react differently to the same design, however.

In this study we discovered that in many cases, children reacted just like adults. In some cases, their reactions were even more extreme than those of adults. There are, however, situations in which children react completely differently. These similarities and differences should be taken in to account when designing for a specific audience.

SIMILARITIES

Initial Reaction

People today have seemingly endless options as to how to spend their time and how best to accomplish their goals. Other media and devices, such as TV, newspapers, books, videogames, cellular devices, and CD-ROMs, all compete with the Internet for the users' precious time and energy. Because the user is busy and has lots of choices, his or her first impression of a website is crucial. Both adults and children react immediately to websites. Some get excited and want to dig in and find something interesting, while others want almost immediately to click the Back button and look for something else.

A good initial impression is one that satisfies users' wants and goals. When users are looking for information, they want to see that, yes, this is the place they can find it. When users are looking for entertainment, that's what they want to find. No matter what the users' goal is — the homepage's initial impression greatly affects the rest of the user's experience by setting the tone. When the first impression is good, users tend to be more forgiving with later design problems.

Good Design

When a design is simple and useful for adult users, it will also be suitable for kids. Kids use well-designed general-audience websites successfully (Amazon, Yahoo!, etc.). For general tasks like browsing, searching and buying books, kids do not need a special children's interface.

The basic principles of good design include using legible text. Font size, typeface, and visual contrast are extremely important to both adults and children's user experience. When users have a heard time reading text, even when it presents content they're interested in, they often abandon the effort. Straightforward fonts and simple text layouts make reading easier.

Neither adults nor children read long texts on the Web, however. Reading is a way to get at the content or interaction desired. Users scan headings and titles and generally read only short paragraphs. Sometimes kids didn't scan, but read all the text on a page. They were sometimes discouraged, though, when they saw there was a lot of text to read.

Both kids and adults would rather get less, but high-quality, content than a larger variety that includes low-quality content. Once users encounter low-quality content, they assume it is representative of the whole website and often won't look further.

Standardization

When users have learned to use a specific interface, they welcome similar interfaces that require them to invest little time in learning. Both adults and kids would rather spend time on the content they came for, than on figuring out how to get to it.

People of all ages prefer quick and simple form design and password processes. If something doesn't work the way they expect — they try to figure it out, but have negative feelings about the experience. Users feel they shouldn't have to deal with these issues.

Similarly, understanding icons should be effortless. Both kids and adults understand icons better when they make sense in terms of users' real-world experience. Users of all ages become confused when 'icons and symbols have different meanings than what they're used to.

Control

Both adults and children want to be in control of their Web experience. They want to have the option to stop activities and resume them as they please, and to have the option to use help and search when they choose. All users become frustrated when they feel they have been denied the option to do what they want to do. Features as simple as the "skip" link for Flash movies allow users to stay in control. Features as common as removing the browser's navigational buttons take the users' control away. Users become annoyed when they can't control their computing environment as they are accustomed to doing.

Another aspect of control includes understanding how to get to the content you want. Both kids and adults don't like being in a situation where they do not understand the interface and how to use it. Vague or jargony terms for categories and titles can cause users problems. These *marketese* terms may sound cool, but they might cause people to spend too much time trying to figure out what to click in order to get what they're after, causing them to leave the website disappointed.

Technical Interferences

Users don't want to deal with things they don't understand. Technical difficulties are perceived as anything from annoying to unbearable, when people of any age have problems during their Web experience. This reaction is especially severe for problems caused by inappropriate or unwanted uses of technology. One of the most common annoyances is waiting for long downloads. Users do not want to wait more than a few seconds for content they didn't ask for. Even when they ask for specific content, they are willing to wait only a few seconds longer. After that they click the Back button and go look for something else.

DIFFERENCES

Goals

The first big difference between adult and child users today is the reason they use the Internet. The majority of the adult population uses the Web to find information. Adults go to news sites, search engines, content portals, and shopping sites, looking for updated, immediate information that can't be obtained using other media. Other

adult goals include communication and community participation. Kids (grades 1–5), on the other hand, go to the Web mainly for entertainment. They look for games, jokes, and content related to their favorite characters and idols. A growing number of kids use the Web for information and communication as well; but for now, they are not in the majority.

This difference in user goals requires separate design assumptions for websites aimed at the two audiences. Although the end products and user experiences desired by kids and adults are very different, they all want to get what they're looking for. So no matter how different the content is, it must always be easy to access and use.

The divergent goals of most children and adults on the Web affect the use of animation and sound. Because many kids look for entertainment on the Web, multimedia elements are very attractive when they serve content in a richer and more amusing way. Adults, however, may not find these features useful, and therefore generally prefer not having multimedia disrupt a simple user interface on an informational website.

Scrolling and Reading

Children scrolled less than adult users, which caused some users to miss important content without realizing it. A few years ago, adult users didn't scroll much either, but by the end of 2001 more people were scrolling down two or three screens to find more information. Kids may also change their behavior as they become more familiar with the medium.

Reading text is a big thing for kids, especially in the early reading years. Unlike adult users, many kids tried to read all the text on the homepage, including category names, links, and so forth. Many kids read game instructions thoroughly before starting to play the game and became upset when a game didn't have any instructions.

Readability levels are of concern when designing for younger kids. When designing for adults, maintaining a level of tenth-grade readability is usually recommended. Readability levels for kids vary greatly, however. Designers must make sure the site's readability matches the specific users' level and that they have no difficulty understanding words in the website's text. A too-low readability level may also be problematic, because kids may decide the content as too childish for them, and therefore designed for younger kids. If that happens — they might leave.

Commercial Awareness

It has been shown many times that adult users do not click on promotional banners. Often they don't even notice the banner ads and can't recall their content. Adults are used to advertising in all the media around us — TV, billboards, newspapers and magazines. They usually know how to differentiate real content from "push" advertisements. Children do not (yet) distinguish among promotions, advertisements, and the actual content of a website, however. They mistake promotional content for real content, and thus can be distracted away from a website and are more vulnerable to commercial promotions.

User Groups: Ages, Languages, Genders

In this exploratory international study, we tested websites with a wide variety of young users. They varied by age, (grades 1–5 or ages 5–10), by country of origin (United States and Israel), and by gender.

INTERNATIONAL DIFFERENCES

In the USA, 39 users tested websites, and 21 tested sites in Israel. The study sessions in Israel took place in two different settings — school and home. Both national groups had members of various ages and contained both boys and girls.

The facilitators and participants spoke English during the sessions in the US, and in Israel sessions were conducted in Hebrew. Conducting studies in users' native language is important in order to capture realistic reactions and answers, even when users speak more than one language. The Israeli kids were presented with both American and Israeli websites designed for their age group. (Israeli kids are exposed to English informally on TV and with computer software; but they start studying it formally in the third grade.) They were asked to complete the same tasks as the American kids on both kinds of websites.

Language Issues

In general, the Israeli kids reacted to and interacted with American websites just as the American kids did. The usual international usability problems occurred in this study as well, however.

Reading and understanding text is a big hurdle for international users. Because Israeli kids start formal English studies in third grade, first and second graders usually couldn't read any of the English category titles or explanatory text. For some activities, reading wasn't necessary because the interface was self-explanatory. When using familiar (mainly from CD-ROMs and video games) types of interfaces (for example, the coloring activities found on almost every children's website), kids knew exactly what to do and didn't mind the foreign (English) text alongside the activity.

In other cases, users became very frustrated: "*How do they want us to play this if we can't understand? They should add translations in Hebrew for Israeli kids!*" – (Second-grade boy)

Israeli kids were excited when they encountered familiar characters and brands, but they became frustrated when they didn't know how to find relevant activities. Even some of the fourth graders said that they usually prefer not to surf American websites aimed at kids their age, because there is a lot of text, and it's just too much work to translate. They can easily read the text at websites designed for younger kids'; but the content there is less interesting.

When designing a children's website with international audiences in mind, the visual presentation of information is even more important than usual. Icons for various categories and activities play a crucial role. If users understand the icons, they may discover an activity they enjoy. If they don't understand them — they will go someplace else. By making sure users understand the navigation components visually (independent of any text), designers can make websites more accessible — not just for international users — but also for the local children who are less-experienced readers, those who struggle with reading, and those who have learned English as their second language.

Computer and Technology Use

Beginning age: Kids in Israel and the US started using their computers at about the same age (a short time before their fifth birthday).

Frequency: Israeli children used their computer substantially more then American kids did. Almost all the kids we talked to in Israel used their computer every day, while in the US the average was only a few times per week.

Activities: More Israeli kids (74%) used the computer (both Internet and software) for homework than American kids (55%); however 90% of all kids in our study used their computers for play. Israeli kids shopped via their computer the same as American kids their age as well.

Companions: In the US, 45% of the children in our study used the computer with their parents; however only 15% of the Israeli kids did so. Israeli kids often used their computer either with friends or siblings, and 50% used it alone (compared to 27% of American kids).

Other technologies: The technological environment children grow up in and the other devices they use influence their conceptual models and expectations for interacting with new technologies. In our study, 74% of the Israeli children used cell phones regularly, but only 55% of the American children did. American kids have more gaming technology at home, however, notably GameBoy (50% US vs. 26% Israel), and PlayStation (36% vs. 26%). Also, a small number of American children had pagers (5%), while none of the Israeli kids did.

GENDER DIFFERENCES

Content and Interaction

The main difference between boys and girls was preferred content, not interaction preferences or behavior patterns. Although younger kids liked Sesame Street and Willy Wonka content, users disagreed completely about other sites. Doll websites (Barbie, American Girl, and so forth) were popular with girls but disgusted the boys. Many types of sports content appealed equally to boys and girls; it seemed mainly a matter of personal preference.

Recent studies showed that girls have clear ideas and strong feelings about what kinds of games they would design: games that feature simulation, strategy, and interaction. Games like that would in fact appeal to both boys and girls[32].

Girls in our study were found more likely to use the Internet for education, schoolwork, e-mail and chat rooms, while boys tended to use the Internet for entertainment and games.

We found no substantial difference in the way boys and girls interact with computers in general and the Internet in particular. We tested same-gender pairs and single users, and we found everyone to be susceptible to the same design problems. Some of the following slight differences might be important to designers who are seeking to target a specific group, however.

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[32] "Educating Girls in the New Computer Age" by the American Association of University Women Educational Foundation, 2000. www.aauw.org/2000/techsavvy.html

Text and Reading

More girls read all the text, while more boys were impatient and just clicked away. Some girls even mentioned to us when they thought there was too much or too little text, underscoring its importance to them.

Girls also preferred written instructions. They usually read directions carefully and commented on their usefulness or lack thereof. When a website lacked instructions, a text label on the homepage, or basic textual navigational elements, it usually got negative comments from girls — especially when they were looking for something specific, such as a game or activity.

Computer and Technology Use

Beginning age: The girls in our study started using the computer a bit earlier than the boys. Boys' average starting age was five, but girls started on average at age four and eight months.

Frequency: Boys tended to use their computer a few more times per week than girls.

Activities and other technologies: On average boys prefer spending more time playing on the computer than off the computer, than girls. Although 65% of the boys had GameBoy, and 48% had PlayStation, only 11% of the girls had either one. In general, boys used their computers more for daily activities such as homework and play.

Companions: A big difference appears in the company each gender keeps while using the computer. Although 39% of girls use their computer with their parents, only 13% of boys do. This finding may imply more about the difference in the attitudes of the parents of boys and girls, than about the children themselves, however.

How this Study Was Conducted and Why

Very little research has been published about kids' Web usability, so when approaching this study we started with very broad questions regarding children's Web experience. After an initial exploratory study, we designed more specific tasks and questions and followed with a second phase of studies. Altogether we tested 24 websites that varied in content and use of the Web, with 55 kids as users.

Users and facilitators sat together at one computer, and the sessions were recorded on videotape. Sessions took place in several types of setting, and sometimes two users worked together in co-discovery.

About the Sites Studied

We chose websites that incorporated various kinds of user experience. Some sites had more multimedia while others were more text-based. They had various levels of interactivity and belonged to several genres (More on genres on page 9). All the websites for kids in our study had games and activities. Both kids and sites were divided by age group. The kids were grouped by school grade, and the sites were grouped according to both site content and statements of age-appropriateness on the sites.

We tested 19 American websites with 39 kids in the US. In Israel, we tested an additional 5 local sites in Hebrew and 6 American sites in English.

In addition, we also tested some websites intended for adults with the older users (grades 4–5). We chose websites that adults find easy to use, according to other user studies: weather.com, Yahoo! and Amazon.

Unfortunately, some of the websites we tested disappeared before this study was published. By the time you read this, more may be gone.
The websites marked with * weren't available in March 2002.

1. ABC news for Kids — http://abcnews.go.com/abcnews4kids/kids
2. Alfy — www.alfy.com
3. Belmont Bank Kids' corner — www.belmontbank.com/kids
4. Bonus — www.bonus.com
5. Boom — www.boom.co.il
6. Free Zone* — www.freezone.com
7. Fun Brain — www.funbrain.com
8. Galim — www.galim.org.il
9. Game Brain — www.GameBrain.com
10. Game Goo — www.earobics.com/GameGoo/gooeyhome.html
11. Kids Korner — www.kidskorner.com
12. Kids.co.il — www.kids.co.il
13. Kids.com* — www.kids.com

14. Loop   www.loop.co.il
15. MaMaMedia   www.MaMaMedia.com
16. Playhouse Disney   http://disney.go.com/park/bases/playhousebase/today/flash
17. Sesame Street   www.sesameworkshop.org
18. Sport Illustrated for Kids   www.sikids.com
19. Squigly's Playhouse   www.squiglysplayhouse.com
20. The Kidz Page   www.thekidzpage.com
21. Willy Wonka   www.wonka.com
22. Yahooligans!   www.yahooligans.com
23. Yoyo*   www.yoyo.co.il
24. Zeeks   www.zeeks.com

About the Participants

When deciding which age groups to test, we tried to define user differences for kids. We focused on elementary-school kids, younger than those in the 'tween and teen categories (who are generally in middle school or junior high school). We tested two main user groups — younger kids (grades 1–2) and older kids, (grades 4-5). All users in our study had at least three months' experience using the Internet, because we wanted to eliminate the issues of first-time users.

We conducted sessions with 55 users in this study: 30 boys and 25 girls. Of these, 33 were younger kids and 22 were older kids. The children were also in two different countries: 16 kids participated in Israel and 39 kids in the US.

Users Grouped by Age and Sex

	Girls	Boys	Total
Younger (Grades 1–2)	15	18	33
Older (Grades 4–5)	10	12	22
Total	25	30	55

Testing Sessions and Survey

Because the initial sessions were exploratory, we tried to gather as much general information as possible. We collected three types of information from each user session:

1. **Questionnaires** – The parents of our participants filled out a questionnaire regarding their child's use of technology. This questionnaire focused on patterns of use at home.

2. **Interview questions** – At the beginning of each session, we asked users a few questions. These questions concerned their attitudes, their use of computers in general, and their use of the Internet specifically.

3. **Task observations** – In each session, users were asked to complete various tasks on two or three websites. The tasks varied from general navigation, such as: "Find a game you would like to play," or "find information for your school project," to more specific tasks related to a particular type of website feature and particular usability problems.

We analyzed the data from phase one and found specific behavior trends we wanted to study more thoroughly in phase two. For phase two, we chose a smaller number of websites that presented the phenomenon we were investigating and created more specific tasks for the users to complete. For example: "find out what a deposit slip is" on Bellmont Bank's website in the kid section.

Testing Environments

First we had to decide where to conduct the sessions. Because this was an exploratory study, with a substantial number of users (55), we decided to try three different settings: usability lab, school, and home. We conducted each session with one facilitator and one or two children in the room. Parents often waited in a separate room but did not observe the test.

Usability lab — We used a typical market-research lab for these sessions. One room was designated for the actual user test and another for observation (behind one-way glass). In the main room were a computer on a standard table and a few office chairs for the facilitator and participants.

Advantages: In the initial exploratory sessions, additional researchers were able to help observe behavior and spot trends. In addition, using a lab made it possible to test many users one after the other, with a receptionist assisting newcomers and the comfort of a waiting room.

Disadvantages: Some users needed time to become comfortable in the lab environment. Although kids were aware of the observation mirror, it didn't seem to bother them. In addition, the computer may have been different from those they regularly use and the chair and table weren't the size they were accustomed to.

School — We conducted sessions in two different schools, in Jerusalem, Israel and Palo Alto, California. The sessions took place in the library of each school, where there were several computers in a quiet area. This location allowed us to meet with participants during classes and breaks, without interfering with school or being disturbed. Users and facilitators sat next to each other at one computer.

Advantages: Users were very familiar with the environment and seemed confident about themselves and their interaction with the computer. Also, it was easy to schedule a number of sequential user sessions on the same day.

Disadvantages: Libraries had distractions, even though everyone in the schools did their best to assist us in our study. There were kids borrowing books and reading and small groups doing quiet personal work. Because we did not use headphones for the audio websites (so facilitators could hear the both the users thinking out loud, and the websites audio feedback), other students in the room were distracted sometimes and interfered with our tasks. Some of our users became self-conscious as a result.

Home — We conducted some user sessions in participants' homes, using their own computer. We traveled from home to home, setting ourselves up in the kids' own

computer environment. These varied from small tables and chairs to living-room family workplaces.

Advantages: Users were familiar with their computer and immersed themselves immediately in various tasks. Also, the physical environment was comfortable and familiar, and therefore less distracting (no swiveling around in office chairs …). This natural setting gave us a more realistic picture of problems users face in actual, rather than contrived, computer environments.

Disadvantages: Organizing the sessions was very complicated, and these sessions took more time, because the facilitators had to travel to each home, set up the equipment (video camera), and travel back. Also, sometimes the home settings weren't exactly suited for studies — for example, some computers had no speakers, some had modem Internet connection problems, and so forth.

Final Study Structure

We conducted the study in two phases:

Phase 1 – Exploratory testing
Location #1: San Diego, CA
Environment: Professional testing lab
Users: 23. Ten girls and 13 boys, 11 younger and 12 older
Goal: Explore, look for trends and general behaviors.

Location #2: Israel (Jerusalem and Tel-Aviv)
Environment: Home and school
Users: 16. Seven girls and 9 boys, 6 younger and 10 older
Goal: Compare with US users and confirm usage trends.

Phase 2 – Focused testing
Location: Palo Alto, CA
Environment: School
Users: 16. Eight girls and eight boys, all younger
Goal: Look at specific issues and fine tune observations.

About Using this Methodology

DESIGNING STUDIES

Only a few studies about children have appeared in human computer interaction and usability research. As a result, this study was designed to cover a relatively broad age range and set of topics that influence kids' user experience. We narrowed and focused on trends we found substantial, and then fine tuned the tasks until the findings were significant.

Because we were looking for general in children's user experience, we decided to test a variety of websites, which included various uses of the Web for kids. We chose one common theme — websites that include games and activities for kids — and many different implementation methods: multimedia, text, highly interactive features, and so forth.

Users' Motivation

In retrospect, when we considered the various results we got in different environments, an additional factor came up: The participants' motivation to take an active part in this study. Users at home were less motivated to contribute to the study than the ones tested at school.

At schools, we visited a couple of weeks before the sessions began and passed out questionnaires, letters to parents, and release forms to be signed. We told students we could not have everyone participate in this study and that the teachers would choose students from those who brought back the forms filled out. Teachers chose students based on their knowledge of computers (at least three months experience on the Web) and according to class schedule. Students perceived the process as a competitive selection, however, and all wanted to be chosen to participate. So when these kids finally came to the study, they were very excited that they had been selected and were eager to help us out.

In contrast, the kids we tested at home had a very different reason to participate in the study. We found most of these families through the parents. We got in touch with parents who agreed to let us into their homes and conduct user testing there. Through the first volunteers we found other families in the same area. So for the home sessions, parents were the active parties in initiating the study, not the children. All children in this group were cooperative, but in general they were less enthusiastic than the school kids about taking part on the study.

In the lab environment, users had a diverse set of motivation factors. Some of the kids came because their parents said they would get paid (true), and others saw it as a learning experience. In general, users were more motivated to participate in the lab than in the home setting, but less so than those in the school setting.

Co-Discovery Sessions vs. Single Participants

In each of the various user sessions and environments, we tested with both single participants and same-gender pairs. Following Brenda Laurel's advice, we asked some of the kids attending the sessions to bring their best friend with them. During these co-discovery sessions, a pair of users sat in front of the computer with a facilitator next to them.

The best friend had a dual role — to make sure that their friend didn't make up things, and to facilitate conversation. The *think aloud* method[33] is hard enough for adults, but for some kids (especially younger ones) it was almost impossible. Having a child's best friend there let the child talk to someone besides the facilitator in a natural manner, as the two children explain to each other what they are thinking of doing and why.

The co-discovery method has a drawback, however. By creating a co-discovery user environment, we are testing the user experience in a less-accurate way, because most of the users do *not* use the Internet with their best friends (more about this on page 107). This difference means that the hurdles they encounter and problems they overcome may not be handled the same way in normal user settings. In fact, discussing interface and design problems together may assist users in overcoming many usability problems that may have caused them to leave the site, if they had been on their own. When a pair of users gets stuck because of a usability issue, however, you can be sure it's a major problem, because even two users working together couldn't figure it out.

Disclosure Permissions for Children

When conducting user sessions with underage participants, researchers must make sure they obtain all the relevant agreements from the caretakers. Parents must sign a release in advance agreeing to allow their children participate in the study. Also, they must be informed where and via which media the study's findings will be published (including any video taping of sessions).

For studies at schools, the process is a bit more complicated. Outside researchers must get permission from the principal personally in order to enter a school. If the principal does not know you personally, he or she might ask you to get a permit from the local school district or the representative of the ministry of education, for example. These permits could take months to obtain, so take that time into consideration when scheduling projects in schools.

The most efficient way to test at a school is to do so where there are teachers and parents who are interested in kids and technology and want to help create better quality software for kids. These people can help you find users and can make the whole permit process less complicated.

International Testing

International testing is complicated to execute from a long distance away. Setting up the various testing environments — homes, schools or labs, is harder to do when you are not actually in the target country, because it often requires meetings and phone calls take place during work hours in another time zone.

It is helpful to have a local usability person lay the groundwork for the study ahead of time, so once you arrive, time won't be wasted on bureaucracy. In any case, the studies themselves must be facilitated by a local usability expert. We have

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[33] Thinking aloud is a method for achieving qualitative data from a user. As the name suggests, the user should think aloud while performing some specified task with the system. By verbalizing their thoughts, target users enable us to understand how they view the computer system. More about this method is explained on CID's website:
http://sunrize.nada.kth.se/usor/jml.cgi/Methods/thinking.jml?graphics=true

emphasized this recommendation for adult user testing in other reports, but for children it is even more crucial. The world of children is very current, and their vocabulary is influenced by pop culture. Understanding the slang and exact phrases they use is important in order to interact with children and understand their reactions and interactions with their friends, the medium tested, and the facilitator.

Using Your Own Kids

Often, finding and paying outside users is almost impossible, given website development timelines and budgets. As a result, many people bring their own kids and other employees' kids into the labs as users to test their designs. Although sometimes this is the only option (it is better than nothing), in other cases it is not recommended. The developers' children could have prior knowledge about the project, and therefore would not act the way first time users would.

Also, those kids have different motivations because it's a family project when they know their parent is involved. Further, children whose parents are in the interactive industry usually are exposed to and have experience with interactive environments more than other kids. Thus, during user testing they may overcome issues that the average user would not. If they do not overcome a problem, however, then the problem definitely needs to be fixed.

EXECUTING STUDIES

Understanding Users' Thoughts

As mentioned previously, children may have a hard time verbalizing their thoughts. Younger users have a lot more trouble thinking out loud than adults do. Many facilitators start sessions with general interview questions, to help the user get comfortable with them and the unfamiliar environment. This technique was helpful with children, but with younger users, the answer "I don't know" came up a lot.

The *think-aloud* method complicated things a bit more. Facilitators encouraged users to speak their thoughts during the testing session, so the facilitator could better understand their dilemmas. The facilitator — and afterwards the user — practiced thinking out loud as they took a pen apart. Users succeeded in transferring the pen experience to the screen; but after a while their thoughts became silent again, and they needed a reminder.

When planning these studies, design the environment to be as pleasant for kids as possible. The facilitator should not look or act too authoritative, which could alienate users. Kids should feel comfortable and safe about sharing their thoughts and feelings.

Pleasing

Like adult participants, kids also want to please facilitators. They want to be good and get it right. The problem is that there just is no right answer in user testing. It isn't the participants who are tested — it's the websites.

It is very important to emphasize this point of view to users at the beginning of the session. Facilitators could also explain, for example, that the users in the study are their "web experts," who will find what's good or bad about a website, in order to

help improve the design for other kids. Users need to understand their role as Web surfer and critic.

Users pick up additional cues from facilitators' remarks during the session. Any comment accompanied by a positive or negative reaction is immediately interpreted as something they should or shouldn't do again. Facilitators must be especially careful to keep their responses neutral and meaningless when working with kids.

Compensation

Because kids attending these sessions are lending their time and good will, they should be compensated like any other participant. The kind and size of compensation may vary, however. During the lab sessions, we prepared cash ahead of time, and handed it over to the caretakers after the session. Both kids and parents knew about the payment before they came and were looking forward to it.

In our school sessions, we discussed this issue with the teachers and school technology coordinators ahead of time. In one case the teachers insisted we should not compensate individual students, but rather the classroom, so we bought the class books and posters. In another case, the teacher agreed to a small educational toy, which we found plenty of at the Discovery Store.

In the home sessions, we gave local bookstore certificates to each kid after their session. This came as a surprise to them, because they (and their parents) had agreed to participate in the study regardless of compensation. They were all very pleased at the surprise gift, which seemed both fun and educational.

When planning sessions, researchers must consider the motivation of the participants (and their parents), and decide accordingly whether they should offer cash or a small gift. When testing at schools, it is important to consult the teachers and other staff in order to make sure there are no conflicts regarding compensation.

Online Concerns for Parents and Children

Children's experience of the Internet is not only influenced by its design and use, but also by kids' expectations and knowledge. Many of the underlying behaviors described in this report may change gradually, when children become more aware of and educated about the Web experience.

There are a number of issues children should be made aware of that can make their use of the Internet more gratifying, fun, and safe. For example, children should be taught the meanings of Web promotions and the ramifications of clicking them. When kids understand these issues it will also help make web design for kids more simple and straightforward, and get the users the experience they want.

WHAT KIDS' CARETAKERS SHOULD KNOW

Children should learn what motivates companies to put content online so kids (like adult users), can make better judgments regarding quality of content. This media education would also give kids a foundation for understanding other information they are exposed to. Kids show more discernment with other media, such as TV, where they are told some of the content they see may not be appropriate or reliable. In a recent study, however, kids said parents should worry more about what they're seeing on TV than what they see online[34]. Unfortunately, that may not be true.

Promotions

Advertising is one of the main methods of making money online today. Adult users are usually media savvy and can recognize advertising. They tend not to click on banner ads and often don't even notice them. Children, however, do not distinguish between promotional content and core content. As a result, they are more vulnerable to commercial promotions on the Internet than on TV or in magazines, media with which they are more familiar. They can become frustrated when they receive promotional content instead of the content they were looking for.

Sponsored online gaming is even worse. These ads are disguised as games, including familiar characters in the games, so marketers can convey their messages. These pseudo-games are not just more commercial content — they also present opportunities for companies to capture users' personal information. E-mail addresses are just one example of the information companies can collect. Games can offer prizes, prompting players to register with their contact information. Also, companies sometimes use game players as virtual focus groups, asking them to answer surveys and make choices that reveal their preferences.

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[34] 'Harris Interactive YouthPulse,' Harris Interactive, 2000

Candystand.com is an online gaming site operated by LifeSavers Co.

Adults should surf the Web with kids and point out different variations of banner ads, explaining their purpose and meaning. More important, they should explain how to tell ads from content, by finding "ad" labels hidden on the page or by observing the use of logos and marketing jargon.

Privacy Issues

In the United States there are new laws regarding kids' privacy online[35]. These laws try to protect users from exposing their personal details to websites, so they won't be used for commercial purposes. The laws include involving parents in the process, such as obtaining parental consent before collecting kids' personal information. The laws aren't enough, however. A recent study of the 162 websites with the highest percentage of visitors under age 13 revealed that sites often didn't follow the rules[36].

Parents should explain to kids the dangers of giving away personal details online. They should understand why some companies want to get their name, age, address and phone number, and how they want to use it. They should learn about their right to privacy under law and to avoid and distrust websites that ask for personal information.

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[35] Children's Online Privacy Protection Act, April 2000. http://www.ftc.gov/opa/1999/9910/childfinal.htm

[36] "'Privacy Policies on Children's Websites: Do They Play by the Rules?,'" Joseph Turow, The Annenberg Public Policy Center, 2001. www.appcpenn.org

Dangers Online

Commercial intentions are only one of the dangers for kids online. Others may take the form of individuals who want to take advantage of kids' naïveté and lure them into dangerous situations. Children must be made aware of this threat and of how easy it is to disguise oneself in the Internet.

Kids should be taught never to use their real name on the Internet, just as they would never talk to a stranger, and instead invent a "user name" or "screen name." Children should learn to create passwords and to become suspicious when strangers ask for personal information[37].

Much has been made of so-called kid-safe surfing. To date, no foolproof automatic way exists to shield kids from random badness on the Web. Worse, perhaps, are the products that purport to protect children from sexual content but secretly also block them from political, religious, medical, and other important kinds of content either by design or through heavy-handed keyword blocking[38]. There's still no substitute for a watchful parent and an informed, media-savvy kid.

WHAT KIDS SHOULD KNOW

There are additional skills and concepts that can help kids become more efficient and savvy Internet users. Although some are common techniques used on the Web, they are different than the skills kids develop for other media, such as TV, CD-ROMs, video games, and so forth.

Basic Technical Understanding

Once kids understand the basic workings of their computer, they can fully utilize it as a tool. Many times during our study, kids said that when they encounter technical problems they call someone else for help. This strategy is reasonable, and that's what many adult users do as well. What many kids called "technical problems," however, involved very simple and basic features of the medium, which can be easily understood by children even at five or six years old.

Kids can substantially improve their user experience by learning:

- Browser windows and controls — and what their icons mean (back, forward, stop, home, search and print).

- How to write a Web address and what the various parts of it mean.

- How to close a window and switch between windows.

- The basics of connecting to the Internet.

- What plug-ins are and which ones they have on their computer.

- How to print a Web page.

- What download time is and what influences it.

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[37] More information for caretakers about kids' privacy online can be found at the Center for Media Educations' website. http://www.cme.org/children/privacy/priv698b.html

[38] Babysitting software for kids is controversial at best, ineffective at worst. www.peacefire.org

Searching and Analyzing Results

Many kids start their online sessions by searching for a specific topic. This topic could be anything from their favorite band or sport, to a specific character or school project. Kids should learn to use a search engine and how to read and interpret the results page. Interpretation is especially important when browsing and evaluating many results and for distinguishing high-quality content from bad — although quality judgment is harder and takes time and experience.

Some children's websites include their own Web mini-directory, where kids can look for topics that interest them by browsing in various categories. Using these directories to search for information may be a good way to start, until users gain the experience necessary to evaluate results on general search sites.

E-mail

Although many tweens and teens use e-mail and instant messaging as a major part of their Internet experience, the majority of younger kids do not know how to use e-mail. E-mail can be a great learning and communication tool for young kids. When kids in our study were motivated to write online, they paid attention to spelling and to using the correct wording. They were also often delighted to send direct e-mail to friends and family, something they might not have done without this medium.

E-mail is an integral part of the online experience. Mailing current information to other users and sending links are major activities on the Web today. By learning the basics of e-mail, kids can become active members of the Internet community.

Using the Web for Offline Activities

Many children's activities on the Web are intended to be completed offline. Kids do not necessarily understand this distinction, so they may miss out on many playing and learning opportunities. The Web offers a multitude of activities like printing out coloring books, cooking recipes, arts and crafts, and science projects. Adults should join kids in their Web surfing, and point out the various kinds of activities. Teach kids how to tell whether an activity is meant to be played online or not and how to save and print the offline activities.

About the Authors

Shuli Gilutz is a User Experience Specialist with Nielsen Norman Group, doing both consulting and research. She brought her passion for kids and technology to the design of this study, and facilitated all the user sessions. Shuli has been working in technology training, interaction design and multimedia production since 1995. Before joining NN/g she was a project manager at Israel On-Line (IOL), managing a team doing information architecture, interaction design, and web production. Previously she developed Web learning games for McGraw Hill at Edunet, and at The Moon Co. produced various websites and CD-ROMs including "My Journey to the World of Imagination" for Comtale, aimed at kids ages 4–6.

Shuli earned her M.A. in Learning, Design and Technology from Stanford University, CA, and her B.A. in Psychology and The Multidisciplinary Program of the Arts from Tel-Aviv University, Israel.

Dr. Jakob Nielsen (www.useit.com) is a User Advocate specializing in Web usability and a principal of Nielsen Norman Group, which he co-founded with Dr. Donald A. Norman, former Vice President of Apple Research. Until 1998, Dr. Nielsen was a Sun Microsystems Distinguished Engineer and led that company's Web usability efforts starting with the original design of SunWeb in early 1994. His previous affiliations include the IBM User Interface Institute, Bell Communications Research, and the Technical University of Denmark. Nielsen's recent books include *Designing Web Usability: The Practice of Simplicity* (a quarter million copies in print in 21 languages) and *Homepage Usability: 50 Websites Deconstructed*. Nielsen's Alertbox column about Web usability has been published on the Internet since 1995 (www.useit.com/alertbox) and currently has about 200,000 readers.

Nielsen has been called "the guru of Web page usability" (*The New York Times*), "the smartest person on the Web" (*ZDNet*), "knows more about what makes websites work than anyone else on the planet" (*Chicago Tribune*), and "the next best thing to a true time machine" (*USA Today*). He holds 63 U.S. patents, mainly on ways to make the Internet easier to use.

Acknowledgments

Reports by Nielsen Norman Group

For a full list and to download reports, please see http://www.NNgroup.com/reports

WEB USABILITY GUIDELINES
- Site map usability: 28 design guidelines
- PR sections of corporate sites: optimizing usability for journalists: 32 design guidelines
- E-commerce user experience: 207 design guidelines.
  Series of reports covering:
    - Product pages
    - Category pages
    - Shopping carts, checkout, and registration
    - Search
    - Selling strategies
    - Trust and credibility
    - International users
- Locator usability: 21 design guidelines to help customers find stores, offices, and other company locations ("clicks & bricks")

INTRANET USABILITY
- Intranet design annual 2001
- Intranet design annual 2002 (to be published September 2002)

SPECIAL USER SEGMENTS
- Beyond ALT Text: improving usability for users with disabilities (75 design guidelines)
- Web Usability for Senior Citizens: 46 design guidelines based on usability studies with people age 65 and older
- Usability of Websites for Children: 70 design guidelines

USER-CENTERED DESIGN METHODOLOGY
- 230 tips to improve the way you run user tests
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TECHNOLOGY ANALYSIS AND STRATEGY
- WAP usability report: field study finding