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pp. 116-117 deal with learning to write; pp. 166-177 talk about gross and fine motor skills (in generalities with some sequencing of skills).

Education Design – Noncognitive Development – ROYGBIV (all levels)

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Interaction Design

ADDRESSING CHILD BY NAME

1. Personalizing conversations by addressing people by name is good etiquette. Mishra, Punya & Hershey, Kathryn A. (2004). Etiquette and the Design of Educational Technology. *Communications of the ACM,* 47(4), Pages 45-49. J.B. (B1, A16)

AGE APPROPRIATE: ADDRESS IN DIRECT MANNER

1. Address your user's age in a direct manner. Simply indicate which age group the site/activity if for. Provide entrances (and features) for each age group. Use images, design and content that convey suitability to their age group. Children know and do not respond well to a site that is too far above or beneath them ("This site is for babies" or "This site has too many words and not enough games!")
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 65) J.B. (B1, A7)

ANIMATION: ENGAGEMENT

1. Kids find animation (and sound) extremely engaging. Use animation as a way to focus user's attention on important elements.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 49-50) J.B. (B1, A7)

ANIMATION: GRATIUTOUS, NOT AS IMPORTANT AS EASE OF USE

1. Children like whiz bang animation and sound effects, but even these things won't hold their attention if they come upon something too difficult to figure out or they get lost on a website.
   (2002). Children get impatient on the net. Retrieved on July 1, 2003 from www.bbc.com (This article was based on a study released by the Nielson Norman Group).
   J.B. (B1, A5)

2. Kids like gratuitous, fun sfx, but they must not complicate or slow down the interface. They must lead the child in the direction of the content by reinforcing the concept taught and into interfere with usability.
   Magid, Larry (2002). Family Matters. Retrieved July 1, 2003 from www.cbsnews.com. Page 1. (This article was based on a study released by the Nielson Norman Group). J.B. (B1, A6)

3. Kids find animation extremely engaging. Make sure that the animation does not interfere with the element's functionality.

Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 49-50) J.B. (B1, A7)

ANIMATION: INTROS ARE ENGAGING

1. Users responded strongly to introductory animations that drew them into an activity. They need to meaningful (funny, surprising intriguing, and so forth).
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 49-50) J.B. (B1, A7)

ANIMATION: INTROS LENGTH

1. Make intro animations short and interesting. Animations that are 10-20 seconds long work best.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 52) J.B. (B1, A7)

BUTTON SIZE: INCLUDE DISPLAY LABELS

1. Target (icons) should be big so they can be easily accessed. If the item includes a display label, it should be part of the clickable area.
   Tognazzini, Bruce. (n.d.). *A Quiz Designed to Give You Fitts*. Retrieved July 7, 2004 from www.nngroup.com Page 8 J.B. (B1, A9)

BUTTON SIZE: NEEDS TO BE LARGE FOR CHILDREN

1. Children (especially younger children) perform better when targets are bigger. 4 and 5 year olds performed much better (easier target acquisition) when the button/target was 64 pixels big (as opposed to 32 pixels). The smaller the target, the more hesitation was present in the movements of the mouse.
   Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, & Guimbretiere, Francois (2003). Accuracy, Target Reentry and Fitts' Law Performance of Preschool Children Using Mice (University of Maryland, Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Page 17, 25 J.B. (B1, A2*)*

2. For children, the smaller the target, the more slowly they move the mouse to acquire it. Yet accuracy remains consistent despite the button size, unless the button becomes too small (16 pixels or so) for younger kids (4 years old). The younger the child, the more pronounced this is. Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, & Guimbretiere, Francois (2003). Accuracy, Target Reentry and Fitts' Law Performance of Preschool Children Using Mice (University of Maryland, Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Page, 25 J.B. (B1, A2)

3. If you must use small buttons, slow down the mouse motion by using operating system settings. (However, if the mouse becomes to slow, it will

become frustrating for the child to use). Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, & Guimbretiere, Francois (2003). Accuracy, Target Reentry and Fitts' Law Performance of Preschool Children Using Mice (University of Maryland, Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Page 29 J.B. (B1, A2)

4. Children's hand-eye coordination may not allow for fine selections, so larger icons are preferable for buttons
   Uden, Lorna & Dix, Alan. Iconic Interfaces For Kids on the Internet, Page 4 J.B. (B1, A4)

CATEGORY NAMES: KEEP STRAIGHTFORWARD AND NOT TRENDY

1. When creating section titles or category names, keep the titles simple and informative ('games' for games and 'coloring' for coloring). Avoid vague or trendy names and transitory buzzwords.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 62) J.B. (B1, A7)

CHARACTERS: ADDRESSING THE USER DIRECTLY

1. Allow characters to speak to users and create an opportunity for conversation. 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. Allow characters to transmit important information or to create immediate relationships between the characters on the site/activity and users.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 102-103) J.B. (B1, A7)

CHARACTERS: FUNNY

1. Kids are attracted to characters in general, especially when they are popular and funny.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 100) J.B. (B1, A7)

CHARACTERS: PRESENCE MOTIVATES THE CHILD TO INTERACT WITH THE SOFTWARE

1. If animated pedagogical agents, personas, (or characters in a product) create the illusion of life by interacting with the user, they can motivate the studnets to interact more frequently with the software. (The study involved 12 year olds).
   Lester, James C., Converse, Sharolyn A., Kahler, Susan E., Barlow, S. Todd, Stone, Brian A., Ravinder, & Bhoga S. (1997). The Persona Effect: Affective

Impact of Animated Pedagogical Agents. Retrieved May 13, 2004 from www.acm.org. Pages 2, 11 J.B. (B1, A15)

2. The more users interact with characters, the more engaged they became. Characters that users could identify with motivated them to continue exploring the website.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 100) J.B. (B1, A7)

CHARACTERS: PRESENCE HAS A STRONG POSITIVE EFFECT ON STUDENT PERCEPTION OF THE LEARNING EXPERIENCE

1. The very presence of an animated agent in an interactive learning environment—even one that is not expressive—can have a strong positive effect on student's perceptions of their learning experience. (The study involved 12 year olds).
   Lester, James C., Converse, Sharolyn A., Kahler, Susan E., Barlow, S. Todd, Stone, Brian A., Ravinder, & Bhoga S. (1997). The Persona Effect: Affective Impact of Animated Pedagogical Agents. Retrieved May 13, 2004 from www.acm.org. Page 11 J.B. (B1, A15)

CHARACTERS: RECURRING AND FAMILIAR

1. Greater enthusiasm was demonstrated when the character was familiar to them (from other media). Kids were very excited to see these famous characters and acted as if they were meeting old friends.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 100) J.B. (B1, A7)

CHARACTERS: SAME AGE AS USERS

1. When the characters seemed to be their age, users connected with the characters.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 100) J.B. (B1, A7)

CHARACTERS: SAME FEATURES AS USERS

1. When the characters had a feature in common with the users, they connected with the characters.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 100) J.B. (B1, A7)

CHARACTERS: TYPES THAT MOVITATE HIGHER SCORES

1. Characters that gave feeback to students that was expressive, both verbal and visual, and principal-based instead of task based helped students get higher

scores in the educational software they were using. (The study involved 12 year olds).
Lester, James C., Converse, Sharolyn A., Kahler, Susan E., Barlow, S. Todd, Stone, Brian A., Ravinder, & Bhoga S. (1997). The Persona Effect: Affective Impact of Animated Pedagogical Agents. Retrieved May 13, 2004 from www.acm.org. Pages 9, 12 J.B. (B1, A15)

CHARACTERS: USER CONTROL OF

1. Kids enjoy the ability to influence various characters, and will seek out all the ways they can interact with them. Controlling characters' actions was a great enhancement to the user experience.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 101) J.B. (B1, A7)

CHARACTERS: YOUNGER USERS RESPOND TO

1. The younger users showed the most enthusiasm for characters. Both first- and second-grade boys and girls profoundly enjoyed encountering them.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 100) J.B. (B1, A7)

CHOICE: TOO MUCH VS. TOO LITTLE

1. Too few choices can prove frustrating, but too many choices can also decrease satisfaction.
   Schwartz, Barry (April, 2004). Retrieved October 2004 from www.sciam.com. Pages 71-75 J.B. (B2, A

CLICKABLE ITEMS: MAKE THEM LOOK CLICKABLE

1. Make clickable items look clickable. Differentiate them visually form non-clickable items (3D pushable items are especially effective). Text buttons should be differentiated from static text. Always be consistent in this differentiation! Include animated and audio rollovers for clickable items.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 78-81) J.B. (B1, A7)

COLORS: BRIGHT

1. Bright colors and interesting patterns are important to children and make their learning experience more enjoyable.
   Sedighian, K., & Sedighian, A. S. (1997). *Aesthetic Response: Children's Reactions to Color and Graphics in Educational Software*. ED-MEDIA 97: World Conference on Educational Multimedia and Hypermedia, Calgary, Canada. Retrieved May 17, 2004, from www.cs.ubc.ca/nest/egems J.B. (B1, A17)

COLORS, DARK

1. Darker colors may evoke feelings of anger.
   Sedighian, K., & Sedighian, A. S. (1997). *Aesthetic Response: Children's Reactions to Color and Graphics in Educational Software*. ED-MEDIA 97: World Conference on Educational Multimedia and Hypermedia, Calgary, Canada. Retrieved May 17, 2004, from www.cs.ubc.ca/nest/egems J.B. (B1, A17)

COLORS: VIVID

1. In general, vivid colors such as bright reds and yellows can promote idea generation and activity.
   Sedighian, K., & Sedighian, A. S. (1997). *Aesthetic Response: Children's Reactions to Color and Graphics in Educational Software*. ED-MEDIA 97: World Conference on Educational Multimedia and Hypermedia, Calgary, Canada. Retrieved May 17, 2004, from www.cs.ubc.ca/nest/egems J.B. (B1, A17)

CONTENT: KEEP CURRENT

1. Keep both content and design current. Update it frequently.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 99) J.B. (B1, A7)

DEXTERITY: IMPROVES DRAMATICALLY WITH AGE IN YOUNG CHILDREN

1. Young children's performance in pointing movements should be below that (less accurate and slower) of older children and adults.
   Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, & Guimbretiere, Francois (2003). Accuracy, Target Reentry and Fitts' Law Performance of Preschool Children Using Mice (University of Maryland, Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Pages 2,3 J.B. (B1, A2*)*

2. Younger children show a higher variability in their performance (they have less control) with a mouse than older children.
   Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, & Guimbretiere, Francois (2003). Accuracy, Target Reentry and Fitts' Law Performance of Preschool Children Using Mice (University of Maryland, Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Page 7 (See list of references on page 7) J.B. (B1, A2)

3. Children's performance with a mouse improves with age.
   Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, & Guimbretiere, Francois (2003). Accuracy, Target Reentry and Fitts' Law Performance of Preschool Children Using Mice (University of Maryland,

Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Pages 3, 20 J.B. (B1, A2)

DIALOG: DURATION

1. 10 seconds is about the limit for keeping the user's attention focused on the dialogue. (This was a study of all internet users, not one specifically done for children. Common sense would dictate that the younger the child, the shorter that limit would become).
   Nielson, Jakob (1994). Response Times: The Three Important Limits. Except from chapter 5 of *Usability Engineering.* San Francisco: Morgan Kaufmann. Retrieved from www.useit.com on July 7, 2003. J.B. (B1, A3)

DIALOG BOXES: USE LANGUAGE THAT CHILDREN UNDERSTAND

1. Design interactive dialog boxes so they will not be dismissed automatically. Pop-up windowsk error messages ,download and customization alerts which ask users to make a real choice should be phrased in language and terms users understand (instead of "o.k" and "cancel" it should be "Change my start page" oand "Don't change anything").
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 93) J.B. (B1, A7)

DISPLAY OF MEDIA: TOO RAPID

1. Do not violate the principle of display inertia (flashing changes on the screen so rapidly that the user cannot keep pace or feels stressed).
   Nielson, Jakob (1994). Response Times: The Three Important Limits. Except from chapter 5 of *Usability Engineering.* San Francisco: Morgan Kaufmann. Retrieved from www.useit.com on July 7, 2003. J.B. (B1, A3)

ENGAGEMENT

1. Kids find animation (and sound) extremely engaging. Use animation as a way to focus user's attention on important elements.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 49-50) J.B. (B1, A7)

FEEDBACK: NAVIGATION MADE CLEAR BY

1. Present noticeable "you are here" feedback to users. Show users where they are in the activity/category and where they can go. Make it easy to understand how to move around within the site.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 69) J.B. (B1, A7)

FEEDBACK: VARIETY CAN LEAD TO HIGHER SCORES

1. Combined types of feedback (visual demonstration, verbal, principal based and task based) helped students get higher scores in the educational software they were using. (The study involved 12 year olds).
   Lester, James C., Converse, Sharolyn A., Kahler, Susan E., Barlow, S. Todd, Stone, Brian A., Ravinder, & Bhoga S. (1997). The Persona Effect: Affective Impact of Animated Pedagogical Agents. Retrieved May 13, 2004 from www.acm.org. Pages 9, 12 J.B. (B1, A15)

FEEDBACK: PRINCIPAL BASED IS MORE EFFECTIVE THAN TASK BASED

1. Feedback to students that was principal-based instead of task based helped students get higher scores in the educational software they were using. (The study involved 12 year olds).
   Lester, James C., Converse, Sharolyn A., Kahler, Susan E., Barlow, S. Todd, Stone, Brian A., Ravinder, & Bhoga S. (1997). The Persona Effect: Affective Impact of Animated Pedagogical Agents. Retrieved May 13, 2004 from www.acm.org. Page 9 J.B. (B1, A15)

FIRST IMPRESSION OF INTERFACE

1. Create immediate success. The child's first impression of the site/activity will bias their perception of the entire product. Make it an easy, satisfying experience. One key is to make sure that the breadth of the content is on the homepage to achieve a true initial impression of what the site/activity has to offer and how to easily access it. It should create an overview without creating any false expectations.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 29, 71-75) J.B. (B1, A7)

GENDER DIFFERENCES

1. Boys are more annoyed by verbose pages while girls like instructions.
   (2002). Children get impatient on the net. Retrieved on July 1, 2003 from www.bbc.com. (This article was based on a study released by the Nielson Norman Group).
   J.B. (B1, A5)

2. Boys are more likely to spend time alone on the computer whereas girls spend more time with a parent.
   (2002). Children get impatient on the net. Retrieved on July 1, 2003 from www.bbc.com. (This article was based on a study released by the Nielson Norman Group). J.B. (B1, A5)

3. Girls are less annoyed with large amounts of text than boys are.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Page 37) J.B. (B1, A7)

ICONS: ANIMATED

1. Children find animated icons much more engaging
   Uden, Lorna & Dix, Alan. Iconic Interfaces For Kids on the Internet, Page 6 J.B. (B1, A4)

2. Animating icons must animate in a way that reinforces the concept, not simply move around Uden, Lorna & Dix, Alan. Iconic Interfaces For Kids on the Internet, Pages 4,5 J.B. (B1, A4)

3. There is a significant benefit from having icons animate in order to clarify their purpose and functionality.
   Baecker, Ronald, Ian, Small, & Mander, Richard (1991). *Bringing Icons to Life*. Retrieved May 20, 2004 from kmdi.utoronto.ca/RMB/papers/p5.pdf . (Page 1) J.B. (B1, A19)

4. It is clearly important to keep the animations in animated icons simple, both visually and conceptually.
   Baecker, Ronald, Ian, Small, & Mander, Richard (1991). *Bringing Icons to Life*. Retrieved May 20, 2004 from kmdi.utoronto.ca/RMB/papers/p5.pdf . (Page 3) J.B. (B1, A19)

ICONS: BLACK AND WHITE

1. Black and white icons are very difficult for children to recognize
   Uden , Lorna & Dix, Alan. Iconic Interfaces For Kids on the Internet, Page 10 J.B. (B1, A4)

ICONS: CONVEY UNIVERSAL CONCEPTS BETTER THAN TEXT ALONE

1. Icons can communicate universal concepts more than text. They can reduce the learning curve in both time and effort, and facilitate user performance while reducing errors.
   Baecker, Ronald, Ian, Small, & Mander, Richard (1991). *Bringing Icons to Life*. Retrieved May 20, 2004 from kmdi.utoronto.ca/RMB/papers/p5.pdf . (Page 2) J.B. (B1, A19)

ICONS: SPACING

1. Icons should not be crowded together. Especially if the object is not to more from icon to icon, but from icons to the work area and back to the icons. When the icons are spread apart, users have a ”buffer zone” between icons, where an incorrect acquisition will not result in an unwanted action.
   Tognazzini, Bruce. (n.d.). *A Quiz Designed to Give You Fitts*. Retrieved July 7, 2004 from www.nngroup.com Page 3 J.B. (B1, A9)

2. Stay away from double rows of icons. A single row makes each easier to access.

Tognazzini, Bruce. (n.d.). *A Quiz Designed to Give You Fitts*. Retrieved July 7, 2004 from www.nngroup.com Page 3 J.B. (B1, A9)

ICONS: SYMBOLS

1. Use icons and symbols in familiar ways. Match icon's design to their meaning in the physical world. Don't use familiar images to imply a different meaning than the one users' already know. Keep the meaning of symbols consistent throughout your product.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 32-33, 75-78) J.B. (B1, A7)

ICONS: TEXT

1. Don't create icons that rely mostly on text to communicate their meaning.
   Uden, Lorna & Dix, Alan. Iconic Interfaces For Kids on the Internet, Page 5 J.B. (B1, A4)

INPUT DEVICES

1. The mouse is a better input device than an isometric joystick, step keys, and text keys.
   Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, & Guimbretiere, Francois (2003). Accuracy, Target Reentry and Fitts' Law Performance of Preschool Children Using Mice (University of Maryland, Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Page 6 J.B. (B1, A2)

2. The mouse a more efficient input device than the keyboard, joystick and trackball. It is the most preferred method of 2nd graders.
   Robinson, Linda *Engaging Young Children in Computer Activities.* Retrieved June 29, 2004 from http://www.wiu.edu/users/mimacp/wiu/index.html. J.B. (B1, A20)

INTERFACE: AGE APPROPRIATE

1. Children of different ages require different interfaces, designed to suit their needs. The younger the group, the more specialized the interface needs to be (there is a greater difference between 2 ansd 3 year olds than between 11 and 12 year olds).
   Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, & Guimbretiere, Francois (2003). Accuracy, Target Reentry and Fitts' Law Performance of Preschool Children Using Mice (University of Maryland, Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Pages 29-30 J.B. (B1, A2)

2. When designing an interface for each age group, design for the lowest common denominator. Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, & Guimbretiere, Francois (2003). Accuracy, Target Reentry and

Fitts' Law Performance of Preschool Children Using Mice (University of Maryland, Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Page 30 J.B. (B1, A2)

INTERFACE: CONTROL OF

1. Children are empowered when they feel in control of their environment and when they feel they own the environment. Tightly controlling them with limited paths of interaction bores them. Offer them options for varied interaction that they can explore.
   Uden, Lorna & Dix, Alan. Iconic Interfaces For Kids on the Internet, Page 7 J.B. (B1, A4)

2. We need to understand how we can create new technologies that offer children control of a world where they are so often not in control.
   Druin, Allison. The role of Children in the Design of New Technology. Human-Computer
   Interaction Lab, University of Maryland. Retrieved 2003. Pages 2, 9, 15 J.B. (B4, A9)

3. Children should be offered learning opportunities to construct their own paths to knowledge (according to Constructavists)
   Druin, Allison & Fast, Carina. The Child as Learner, Critic, Inventor, and Technology Design Partner: An analysis of Three Years of Swedish Student Journals Pg. 2 J.B. (B4, A10)

4. Kids want to be in control of their own destiny. They want the ability to stop whatever is happening and resume at a later time. They don't like it when they can't stop an introduction or an animation and they're not happy when a Web page hides the browser's navigational tools.
   Magid, Larry (2002). Family Matters. Retrieved July 1, 2003 from www.cbsnews.com. Page 1. (This article was based on a study released by the Nielson Norman Group). J.B. (B1, A6)

5. Children had greater interest in the computer when they used software than was responsive to their commands and that they could manipulate and explore.
   Robinson, Linda *Engaging Young Children in Computer Activities.* Retrieved June 29, 2004 from http://www.wiu.edu/users/mimacp/wiu/index.html. J.B. (B1, A20)

INTERFACE ELEMENTS: SHOULD ONLY HAVE ONE FUNCTION

1. Do not design interface elements to have more than one intended function. (See the Sesame Street example on page 68).
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (PageS 67-69)J.B. (B1, A7)

INTERFACE INSTRUCTIONS: EXPLICIT TERMS FOR FUNCTIONALITY

1. Provide explicit directions. Tell them exactly what to do. Use terms about how to interact with the interface (click, drag, roll-over etc.) instead of words that refer to the visual outcome (highlight the ball).
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 30-31) J.B. (B1, A7)

INTERFACE: SIMPLE AND UNCOMPLICATED

1. Interfaces that are uncomplicated and simple to use will be much more successful with children.
   Magid, Larry (2002). Family Matters. Retrieved July 1, 2003 from www.cbsnews.com. Page 1. (This article was based on a study released by the Nielson Norman Group). J.B. (B1, A6)

2. The user interface 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. Keep the content design focused and the interactions consistent.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 6, 21-22) J.B. (B1, A7)

MEDIA: INTERRUPTABLE

1. Kids want to be in control of their own destiny. They don't like it when they can't stop an introduction or an animation.
   Magid, Larry (2002). Family Matters. Retrieved July 1, 2003 from www.cbsnews.com. Page 1. (This article was based on a study released by the Nielson Norman Group). J.B. (B1, A6)

MOUSE BUTTON: FUNCTIONALITY OF BUTTONS

1. Software for younger children (especially 4 and 5 year olds) should provide the same functionality through both left and right mouse buttons because they used both indiscriminately to try and achieve the same purpose.
   Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, & Guimbretiere, Francois (2003). Accuracy, Target Reentry and Fitts' Law Performance of Preschool Children Using Mice (University of Maryland, Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Page 27 J.B. (B1, A2)

MOUSE FUNCTIONALITY: CLICK AND MOVE VS. DRAG AND DROP (MOTIVATION AND PERFORMANCE)

1. Children (9-13 year olds in this study) find they perform better and are more motivated with point and click functionality (click once to pick up an object,

move mouse to destination, click again to drop it) as opposed to drag and drop (click and hold to pick up an object, release mouse to place it down).
Inkpen, Kori (2001). Drag-and Drop versus Point-and-Click Mouse Interaction Styles for Children. Retrieved April, 2004 from acm.org. *The ACM Transactions on Computer-Human Interaction,* Vol 8, No. 1, March 2001. J.B. (B1, A1)

MOUSE FUNCTIONALITY: CLICK AND MOVE VS. DRAG AND DROP (SPEED)

1. Children (9-13 year olds in this study) are able to move more quickly with the mouse using click and drag.
   Inkpen, Kori (2001). Drag-and Drop versus Point-and-Click Mouse Interaction Styles for Children. Retrieved April, 2004 from acm.org. *The ACM Transactions on Computer-Human Interaction,* Vol 8, No. 1, March 2001. Pages 17-18. J.B. (B1, A1)

MOUSE FUNCTIONALITY: CLICK AND MOVE VS. DRAG AND DROP (TASKS WITH SUBTASKS)

1. Tasks that require subtasks (placing a rubber band requires a. picking it up, b. placing the first end somewhere, c. placing the end somewhere) are much easier if the point and click method is used. With a drag and drop method, you can't stop in the middle of a process if you do something wrong (you can't leave the rubber band hanging in mid-air after you've released the mouse in an unacceptable spot) but are required to go back to the beginning of the task.
   Inkpen, Kori (2001, March). Drag-and Drop versus Point-and-Click Mouse Interaction Styles for Children. Retrieved April, 2004 from acm.org. *The ACM Transactions on Computer-Human Interaction,* Vol 8, No. 1. Pages 17-18. J.B. (B1, A1)

MULTIMEDIA EFFECTS: DESIREABLE FOR CHILDREN'S SOFTWARE

1. Children want content that is entertaining, funny, colorful, and uses a good deal of multimedia effects.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Page 6) J.B. (B1, A7)

MUSIC: BACKGROUND, INCLUSION IN EDUCATIONAL PRODUCTS

1. Background music should be incorporated into electronic learning environments. Many students reported that background music made learning of the mathematics fun and enjoyable."
   Sedighian, K. & Sedighian, A. S. (1997). *Use of Background Music in Electronic Learning Environments*. ED-MEDIA 97: World Conference on Educational Multimedia and Hypermedia, Calgary, Canada. Retrieved May 17, 2004, from www.cs.ubc.ca/nest/egems J.B. (B1, A18)

2. Kids enjoy cheerful background music. It should not be obtrusive or invasive.

Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 57-58)J.B. (B1, A7)

MUSIC: BACKGROUND, USER CONTROL OF

1. It is essential that learners be given the option to turn the music up, down, or off altogether. (Study of 6th graders)
   Sedighian, K. & Sedighian, A. S. (1997). *Use of Background Music in Electronic Learning Environments*. ED-MEDIA 97: World Conference on Educational Multimedia and Hypermedia, Calgary, Canada. Retrieved May 17, 2004, from www.cs.ubc.ca/nest/egems J.B. (B1, A18)

2. Use background music for ambience but give control to the users. Music should be consistent but not invasive. It is good to give the user control over volume and turning it on-off.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 57-58)J.B. (B1, A7)

MUSIC: FAMILIAR

1. Use music that is popular and familiar to your target audience. Kids especially like music they are familiar with.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 58) J.B. (B1, A7)

NAVIGATION LEVELS

1. Do not use more than two navigation levels or schemes. Too many levels can create confusion. It is easier to show kids all the content choices at once, grouped according to kind rather than burying it or nesting it under several levels of navigation.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 66-67)J.B. (B1, A7)

NAVIGATION TOOLS: USING STANDARD

1. I've been bothered by the tendency of developers to be so creative in their user interface design that they negate what the users already know. Even young children have invested considerable time learning to use standard navigational tools. Creative interfaces are fine as long as you use standard navigational tools.
   Magid, Larry (2002). Family Matters. Retrieved July 1, 2003 from www.cbsnews.com. Page 1. (This article was based on a study released by the Nielson Norman Group). J.B. (B1, A6)

2. Use standard interaction schemes for the features/controls of media players, coloring books, back and go on arrows etc. Standard physical symbols should be used. Kids should not have to re-learn how to use each individual activity.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 24-25, 60-62) J.B. (B1, A7)

NAVIGATION: USING A MAP FOR

1. Using a map interface metaphor is very engaging for children. Design homepages that are maps of an imaginary world, where each object represented a category of content and activities. Geographic navigation metaphors worded, 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 activity.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 73) J.B. (B1, A7)

NUMBER OF INTERACTIONS AVAILABLE

1. Ten year olds may be able to handle an interface that presents them with 25 acitons available through icons, that is too many for a 5 year old to process. Thy younger the child, the less icons should be presented for them to choose between and use.
   Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, & Guimbretiere, Francois (2003). Accuracy, Target Reentry and Fitts' Law Performance of Preschool Children Using Mice (University of Maryland, Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Page 29 J.B. (B1, A2)

PATTERNS: INTERESTING

1. Bright colors and interesting patterns are important to children and make their learning experience more enjoyable.
   Sedighian, K., & Sedighian, A. S. (1997). *Aesthetic Response: Children's Reactions to Color and Graphics in Educational Software*. ED-MEDIA 97: World Conference on Educational Multimedia and Hypermedia, Calgary, Canada. Retrieved May 17, 2004, from www.cs.ubc.ca/nest/egems J.B. (B1, A17)

POP UP MENUS (Jeff note: more study is needed on weather pop-up menus are appropriate for kids)

1. On pop-up menus, the further a target is from the mouse, the larger its clickagle area should be. The icon itself doesn't have to be bigger, but he area which will activate it should be.
   Tognazzini, Bruce. (n.d.). *A Quiz Designed to Give You Fitts*. Retrieved July 7, 2004 from www.nngroup.com Page 8 J.B. (B1, A9)

2. Pop-up menus are good because the travel time to them is zero. They appear at the exact location of the current mouse position.
   Tognazzini, Bruce. (n.d.). *A Quiz Designed to Give You Fitts*. Retrieved July 7, 2004 from www.nngroup.com Page 3 J.B. (B1, A9)

3. When using pop-up menus, make them circular. The distance to the desired target is reduced. This also lets the user simply memorize the direction to go for desired funcitons, thus speeding up the interface.
   Tognazzini, Bruce. (n.d.). *A Quiz Designed to Give You Fitts*. Retrieved July 7, 2004 from www.nngroup.com Page 3 J.B. (B1, A9)

QUALITY

1. It is better to have less variety with everything at high quality than it is to have more variety but some things with less quality. One low quality experience is enough to bias a user against an entire site/activity.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 29) J.B. (B1, A7)

RESPONSE TIMES: LIMITS

1. 0.1 second is about the limit for having the user feel that the system is reacting instantaneously. No special feedback is necessary except to display the result. (Study done for all users, not specifically for children).
   Nielson, Jakob (1994). Response Times: The Three Important Limits. Except from chapter 5 of *Usability Engineering.* San Francisco: Morgan Kaufmann. Retrieved on July 7, 2003 from www.useit.com J.B. (B1, A3)

2. 1.0 second is about the limit for the user's flow of thought to stay uninterrupted, even thought he user will notice the delay. No special feedback is necessary during delays of more than 0.1 second but less than 1.0 second, but the user does lose the feeling of operating directly on the data. (Study done for all users, not specifically for children).
   Nielson, Jakob (1994). Response Times: The Three Important Limits. Except from chapter 5 of *Usability Engineering.* San Francisco: Morgan Kaufmann. Retrieved on July 7, 2003 from www.useit.com J.B. (B1, A3))

3. 10 seconds is about the limit for keeping the user's attention focused on the dialogue. For longer delays, users will want to perform other tasks while waiting for the computer to finish, so they should be given feedback indicating when the computer expects to be done. Feedback during the delay is especially important if the response time is likely to be highly variable, since users will then not know what to expect. (Study done for all users, not specifically for children).
   Nielson, Jakob (1994). Response Times: The Three Important Limits. Except from chapter 5 of *Usability Engineering.* San Francisco: Morgan Kaufmann. Retrieved on July 7, 2003 from www.useit.com J.B. (B1, A3)

RESPONSE TIMES: FEEDBACK

1. A % done indicator should be used for Any operation taking longer than 10 seconds. Do not confuse the user by using a % done indicator for operations lasting less than 10 secondsThis betrays the consistency.
   Nielson, Jakob (1994). Response Times: The Three Important Limits. Except from chapter 5 of *Usability Engineering.* San Francisco: Morgan Kaufmann. Retrieved on July 7, 2003 from www.useit.com J.B. (B1, A3)

2. For operations where the time delay is not known in advance, it is still good to display running feedback in terms of the amount of work done.
   Nielson, Jakob (1994). Response Times: The Three Important Limits. Except from chapter 5 of *Usability Engineering.* San Francisco: Morgan Kaufmann. Retrieved on July 7, 2003 from www.useit.com J.B. (B1, A3)

3. A graphic anim that simply shows that the computer is working should be used only as a last resort (behind #s 1 and 2).
   Nielson, Jakob (1994). Response Times: The Three Important Limits. Except from chapter 5 of *Usability Engineering.* San Francisco: Morgan Kaufmann. Retrieved on July 7, 2003 from www.useit.com J.B. (B1, A3)

ROLLOVER AUDIO: FUNNY AND GOOFY MORE ENGAGING

1. Our users enjoyed rolling the moues repeatedly over icons that initiated sound effects, especially when the sound effect was funny and goofy.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 59) J.B. (B1, A7)

ROLLOVER AUDIO: IMPORTANCE OF

1. Adding sound effects to visual rollovers creates both interactive feedback and a source of play.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 58) J.B. (B1, A7)

ROLLOVER AUDIO: USED FOR NARRATION

1. Add rollovers for audio narration and instructions if your target users are unable to read or are in the initial stages of reading. Record a few seconds of clearly audible and understandable audio clips in age-appropriate language. Play these when icons or instructions are rolled over.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 5835-36) J.B. (B1, A7)

SCAFFOLDING: BENEFICIAL

1. Scaffolding is another element of software which has been found to be beneficial to young children's involvement with the computer. It gives them the support they need to be independent. It can effect children's independence and involvement with the computer and lead to increased cognitive development.
   Robinson, Linda *Engaging Young Children in Computer Activities.* Retrieved June 29, 2004 from http://www.wiu.edu/users/mimacp/wiu/index.html. J.B. (B1, A20)

SCROLLING

1. Children rarely scroll, and interact only with information viewed on the page. (2002). Children get impatient on the net. Retrieved on July 1, 2003 from www.bbc.com. (This article was based on a study released by the Nielson Norman Group). J.B. (B1, A5)

2. Children are less likely to scroll, and there fore more lieklely to miss imprtant information or options if they're presented "below the fold."
   Magid, Larry (2002). Family Matters. Retrieved July 1, 2003 from www.cbsnews.com. Page 2. (This article was based on a study released by the Nielson Norman Group). J.B. (B1, A6)

3. Design for no scrolling. Kids will not scroll!
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 23-24) J.B. (B1, A7)

SCRUBBING

1. Children enjoy exploring the screen, including scrubbing—moving the mouse to search for clickable items- as long as it is easy and rewarding to do so. Children were willing to indulge in mine-sweeping behavior, where they had ot scrub the screen with the mouse in order to find clikcable areas or to enjoy the sound effects played by various screen elements.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 80) J.B. (B1, A7)

SOCIAL RESPONSES TO INTERACTIVE MEDIA

1. Children may be quite vulnerable to demonstrating social response to interactive media (laughing, talking to, concern over characters etc.)
   Mishra, Punya & Hershey, Kathryn A. (2004). Etiquette and the Design of Educational Technology. *Communications of the ACM*, 47(4), Pages 45-49. J.B. (B1, A16)

SOUND: LOUDNESS OR SUDDENESS

1. Do not disrupt users with sudden loud sounds or music. Abrupt changes in the users' environment can be jarring. Turn up sound gradually.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 57-58)J.B. (B1, A7)

SOUND: ENGAGMENT

1. Kids find sound (and animation) extremely engaging.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 49-50) J.B. (B1, A7)

SOUND EFFECTS: INCLUSION IN MULTIMEDIA PRODUCTS

1. Sound effects were one of the top three elements that proved significalntly correlated with preference (when children selected their favorite webistes). Kids preferred the games that had more sound effects.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 59) J.B. (B1, A7)

SOUND EFFECTS: NOT AS IMPORTANT AS EASE OF USE

1. Children like whiz bang animation and sound effects, but even these things won't hold their attention if they come upon something too difficult to figure out or they get lost on a website.
   (2002). Children get impatient on the net. Retrieved on July 1, 2003 from www.bbc.com. (This article was based on a study released by the Nielson Norman Group). J.B. (B1, A5)

2. Kids like gratuitous, fun sfx, but they must not complicate or slow down the interface. They must lead the child in the direction of the content by reinforcing the concept taught and into interfere with usability.
   Magid, Larry (2002). Family Matters. Retrieved July 1, 2003 from www.cbsnews.com. Page 1. (This article was based on a study released by the Nielson Norman Group). J.B. (B1, A6)

TARGET ACQUISITION (SEE ALSO ICONS: SPACING)

1. Pointing movements with input devices are made up of a distance covering phase and a homing phase. Adults click immediately upon reaching a target, but children tend to hover during the homing phase before clicking.
   Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, &Guimbretiere, Francois (2003). Accuracy, Target Reentry and Fitts' Law Performance of Preschool Children Using Mice (University of Maryland, Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Pages 3, 20 J.B. (B1, A2)

2. The distance covering phase is made up of a series of micro-movements and adjustments. The younger the child, the longer it takes them to process and perform these movements. The result is that their movements are slower and less accurate when moving towards a target.
   Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, &Guimbretiere, Francois (2003). Accuracy, Target Reentry and Fitts' Law Performance of Preschool Children Using Mice (University of Maryland, Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Pages 3, 24 J.B. (B1, A2)

3. The younger the child, the more they tend to overshoot the target on their initial movement of the mouse. This indicates that they simply have less control over the mouse. Hourcade, Juan Pablo , Bederson, Benjamin B., Druin, Allison, &Guimbretiere, Francois (2003). Accuracy, Target Reentry and Fitts' Law Performance of Preschool Children Using Mice (University of Maryland, Human-Computer Interaction Laboratory). Retrieved April, 2004 from acm.org. Page2 22-23 J.B. (B1, A2)

3. Icons should not be crowded together. Especially if the object is not to more from icon to icon, but from icons to the work area and back to the icons. When the icons are spread apart, users have a "buffer zone" between icons, where an incorrect acquisition will not result in an unwanted action.

TEXT: AGE APPROPRIATE

1. Maintain a consistent reading level. Keep text age-appropriate. (The "show readability statistics" feature in Microsoft Word is helpful in testing this).
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 39-41) J.B. (B1, A7)

TEXT: ALIGNMENT

1. Keep text aligned left so it is easy to read.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 37-39) J.B. (B1, A7)

TEXT: ANIMATED

1. Don't have text animate while you expect the user to read it (it can quickly animate on screen as long as it stops for the user to read it). Animated text makes it hard to read and frustrates the user who wants to get right to the content.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 36-37) J.B. (B1, A7)

TEXT BUTTONS: DIFFERENTIATE FROM STATIC TEXT

1. Text buttons should look pushable to distinguish them from static titles.

Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 81) J.B. (B1, A7)

THEMES: SHOULD REFLECT USER'S CONTEMPORARY INTERESTS

1. Research your target user's contemporary interests. Present themes that relate to the current trends in your user's group. (Snowboarding is in, polka is out). Take care to update constantly as necessary and trends change.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 96-97 J.B. (B1, A7)

ROLLOVER AUDIO: IMPORTANCE OF

2. Adding sound effects to visual rollovers creates both interactive feedback and a source of play.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 81) J.B. (B1, A7)

TEXT: LEGIBLE

1. It may come as a surprise to some children's Web site developers who like to use odd colors and weird type faces that kids want sites with text that is legible and easy to read.
   Magid, Larry (2002). Family Matters. Retrieved July 1, 2003 from www.cbsnews.com. Page 1. (This article was based on a study released by the Nielson Norman Group). J.B. (B1, A6)

2. Use simple, relatively large fonts. Use at least 12-point type that is easily read. Provide good contrast between the text and the background. Put text on solid backgrounds, not on top of images.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 34-35) J.B. (B1, A7)

TEXT: LENGTH

1. Minimize the amount of text onscreen. Keep it easily understandable and succinct—especially directions. Use icons and audio to help instruct so you don't have to rely so heavily on text. Long pages of text frighten children away, even if they are interested in the content.
   Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 37-39, 45-46, 47) J.B. (B1, A7)

TEXT BOXES: USE STANDARD

1. When asking kids to log in or type their names, use the standard entry boxes they are familiar with. Always make text left justified, never centered! Gilutz, Shuli & Nielsen, Jacob (April, 2002). *Usability of Websites for Children: 70 Design Guidelines.* Retrieved (purchased) 2003 from www.Nngroup.com . (Pages 26-27)J.B. (B1, A7)

USABILITY: NECESSARY IN DESIGN PROCESS

1. User centered design is important in the production of computer products Kantrovich, Lyle (2004, January/February). To Innovate or Not to Innovate. . . *Interactions.* J.B. (B4, A19)

USABILITY: CHILD TESTING NECESSARY

1. Nothing can substitute for a child's input. Adults may think we remember childhood or that we 'think like a child', but only children can give us true children's input. Druin, Allison. The role of Children in the Design of New Technology. Human-Computer Interaction Lab, University of Maryland. Retrieved 2003. Pages 1-2 J.B. (B4, A9)

Interaction Design Reference

1. www.acm.org We have an account with them to view research articles on HCI etc.
2. www.cs.umd.edu/hcil/kiddesign/introduction.shtml Site on research done at the University of Maryland on including children in the design process.
3. www.acm.org/sigchi/ Special interest group on computer human interaction
4. www.chici.org The children computer interaction group. Look under 'people'. There are a ton of articles listed under each person. A lot of them deal with usability.
5. www.cs.ubc.ca/nest/egems website for a completed project on electronic games in the education of math and science. Look under reports and sort them by title for some interesting studies
6. www.cs.umd.edu/hcil The human-computer interaction lab at the University of Maryland. You can do searches on tons of papers and articles.
7. www.letus.org The center for learning technology in urban schools. Has a section containing research papers, including a lot of good ones on scaffolding.
8. www.nngroup.com Homepage for the Nielson Norman Group, an organization dedicated to perfecting user-centered design
9. www.useit.com Jackob Nielson's website. He is viewed as one of the world's foremost authorities on web usability. Tons of great stuff!
10. www.webcredibility.org
11. http://www.wiu.edu/users/mimacp/wiu/index.html Look under articles to see a variety of articles on educating children with computers. Mostly general stuff, not specific interaction info.

Games and Activities

1. www.alfy.com Games and books.
2. www.bonus.com
3. www.gamegoo.com
4. www.homestarrunner.com very creative and amusing. Great engagement
5. www.noggin.com Mostly for preschoolers
6. www.popcap.com Great site with great games.
7. www.protozone.net Very interesting activities
8. www.uptoten.com Games for different age groups.
9. www.zeeks.com Different categories of games

Theme Sites

1. www.disney.com Especially visit Kid's Island
2. www.fisherprice.com Follow link to little people. Mostly promotional but with some simple games.
3. www.muppet.com
4. www.pbskis.org
5. www.wonka.com Promotional, but with some interesting games

Educational/Informational For Kids

1. www.discoverykids.com Site with croc hunter, games, geography stuff. A little promotional.
2. www.glef.org
3. www.historyforkids.com Geared for older kids
4. www.learndev.org
5. www.spacekids.com
6. www.worldwildlife.org Has sections with games and quizzes
7. http://yucky.kids.discovery.com/ Paste the URL. Kids site on bugs, worms, etc.

Educational for Educators

1. www.educatima/structures/.com
2. www.glef.org The George Lucas Learning Foundation. A site called Edutopia about improving public education.
3. www.icdlbooks.org The International Children's Digital Library. A site to search for children's books.
4. www.infoplease.com Encyclopedia type general info site.
5. http://www.iste.org International Society for Technology in Education
6. www.schoolcash.com
7. www.wehelpkids.com Site from Pearson education with educator info/resources
8. www.teachervision.com Resources for teachers

Adult Subsidiary Sites (Kids versions of sites for grown-ups)

1. www.abcnewsforkids.com

2. www.sikids.com
3. www.whitehouse.gov/kids/

Search Portals

1. www.kidsclick.org Collection of educational links based on topic set up for kids by librarians.
2. www.yahooligans.com Collection of links to educational sites, games, and activities. Designed for older kids. Tested very well for children because they found it easy to find what they were looking for.

Product Review Sites

1. www.superkids.com Site that reviews children's software

Interaction Design – General

Allen, K. E. & Marotz, L. (1994). *Developmental Profiles: Pre-birth through Eight*. New York, Delmar Publishers Inc.

Bredekamp, S. & Copple, C. eds. (1997). *Developmentally Appropriate Practice in Early Childhood Programs.* Washington DC: National Association for the Education of Young Children

California Department of Education. (2000). *Prekindergarten Learning Development Guidelines.* Sacramento, California: CDE Press.

Engel, S. (1997). The Guy Who Went Up the Steep Nicken: The Emergence of Story Telling During the First Three Years. *Zero To Three* Journal, January 1997.

New Standards Speaking and Listening Committee. (2001). *Speaking and Listening for Preschool through Third Grade*. Washington, D.C.: National Center on Education and the Economy and the University of Pittsburgh.

Paul, P. (2006). *Want a Brainier Baby? Loading up on tapes, games and videos may not be a smart move. There are better ways to nurture a young mind.* National Scientific Council on the Developing Child at developingchild.net. Retrieved May, 2006 from http://66.102.7.104/search?q=cache:qWfpkL30eOsJ:www.developingchild.net/papers/Want_a_Brainier_Baby.pdf+%22your+baby+can+read%22&hl=en&gl=us&ct=clnk&cd=67

Schickedanz, J.A., (1999). Much More Than the ABCs: The Early Stages of Reading and Writing. Washington, D.C.: National Association for the Education of Young Children.

Schickedanz, J. A., Schickedanz D. I., Forsyth, P. D., & Forsyth, G. A. (2001). *Understanding Children and Adolescents* (4th ed.). Boston, MA: Allyn and Bacon.

Zigler, E. F., Singer, D. G., & Bishop-Josef, S. J. (2004). *Children's Play: The Roots of Reading*. Washington DC: Zero To Three Press.

Interaction Design – Caregiver and computer input

Pg. 597,599 NXN alienbrain - alienbrain://WIALIENWIN01/Central_Park/02Research_and_Development/Interaction Design/Non Central Park/Reseach/articles/Preschoolers and Electronic Media/Age, Ethnicity and Socioeconomic Patterns in Early Computer Use.htm

http://www.usnews.com/usnews/health/articles/990705/archive_001390.htm

Pg. 361-363 NXN alienbrain - alienbrain://WIALIENWIN01/Central_Park/02Research_and_Development/Interaction Design/Non Central Park/Reseach/articles/Preschoolers and Electronic Media/Young Children's Initial Exploration of Computers.pdf

Pg. 359 NXN alienbrain - alienbrain://WIALIENWIN01/Central_Park/02Research_and_Development/Interaction Design/Non Central Park/Reseach/articles/Preschoolers and Electronic Media/Young Children's Initial Exploration of Computers.pdf

http://www.allianceforchildhood.net/projects/computers/computers_reports_fools_gold_2.htm

Interaction Design – Caregiver support

Pg 32-33 NXN alienbrain - alienbrain://WIALIENWIN01/Central_Park/02Research_and_Development/Interaction Design/Non Central Park/Reseach/articles/Preschoolers and Electronic Media/Computers, TV, and Very Young Children.pdf

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Interaction Design – Child interaction

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"Vocabulary, language skills, and knowledge about the world are acquired during interesting conversations with responsive adults. Talking about books, about daily happenings, about what happened at day care or at work not only contributes to children's vocabularies, but also increases their ability to understand stories and explanations and their understanding of how things work—all skills that will be important in early reading" (New Standards Speaking and Listening Committee, 2001, p. 63).

"[Have] Language-rich Environments: Provide opportunities for language use and interaction—provide rich, interesting activities worth talking about" (California Department of Education, 2000, p. 107).

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Interaction Design – Time on the computer

"According to Dimitri Christakis, codirector of the Child Health Institute at the University of Washington, "The more TV babies watch, the more likely they are to have attentional problems later in life." Christakis cites a long-term study that tracked children from age 1 through age 7. It found that for each additional hour of daily TV viewing before age 3, a child's chances of later developing problems paying attention increased 10%" (Paul, 2006, Jan. 8 issue).

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Interaction Design – User interface

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Interaction Design – Music

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