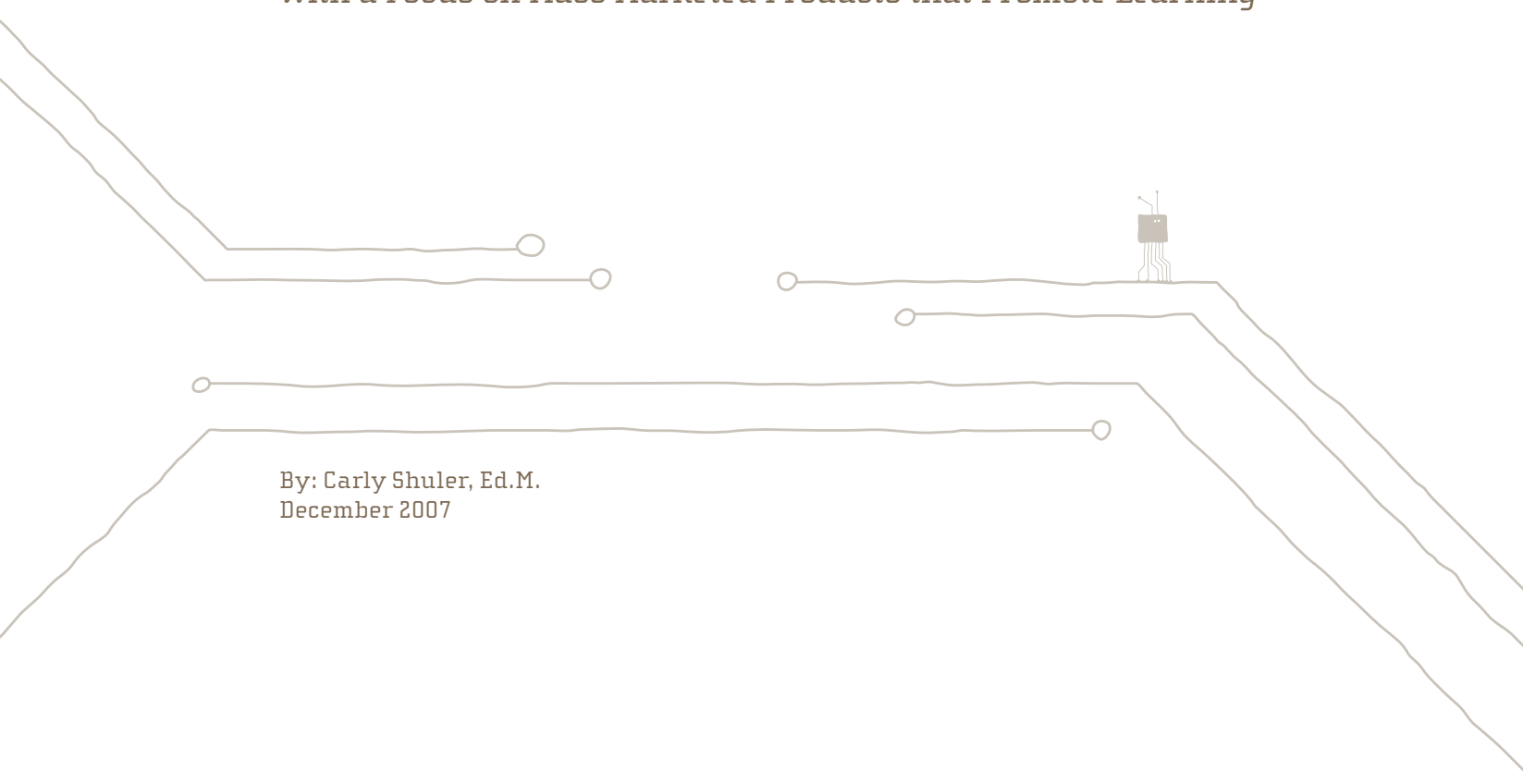


D is for Digital:

*An Analysis of the Children's Interactive Media Environment
With a Focus on Mass Marketed Products that Promote Learning*



By: Carly Shuler, Ed.M.
December 2007

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The mission of the Joan Ganz Cooney Center at Sesame Workshop is to harness digital media technologies to advance children's learning. The Center supports action research, encourages partnerships to connect child development experts and educators with interactive media and technology leaders, and mobilizes public and private investment in promising and proven new media technologies for children.

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The Joan Ganz Cooney Center has a deep commitment towards dissemination of useful and timely research and policy reports. Working closely with our Cooney Fellows, national advisers and media scholars and practitioners, the Center will be publishing a regular series of papers examining key issues in the field of digital media and learning.

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Attn: Publications Department
The Joan Ganz Cooney Center
Sesame Workshop
One Lincoln Plaza
New York, NY 10023
p: (212) 595-3456 f: (212) 875-6088
cooney.center@sesameworkshop.org

Please make all checks out to "The Joan Ganz Cooney Center for Educational Media and Research, Inc."

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foreword: d is for digital

“Technology is everywhere children live. However, finding the positive potential of new media to accelerate children’s learning is not yet part of our national conversation. If we can harness media as a powerful teaching tool, we can help children grow up as literate, responsible global citizens. Now is the time to turn the new media that children have a natural attraction to into learning tools that will build their knowledge and broaden their perspectives.” *Joan Ganz Cooney, Co-Founder, Sesame Workshop*

In 1966, Joan Ganz Cooney charted new territory by proposing to use the power of television to educate underserved preschoolers. Mrs. Cooney was galvanized, in part, by the historic challenge made by the former Federal Communications Commission Chairman Newton Minow, in a speech to the National Association of Broadcasters in 1961, where he referred to television as a “vast wasteland.” Her response with colleagues from industry, research and philanthropy to that indictment led to the creation of the Children’s Television Workshop and *Sesame Street*, now the single largest informal educator in the world. The curriculum development, research and creative process used by these pioneers led to the revolutionary use of the television as an educational medium. The resulting significant impact on children’s learning and social skills has been documented by independent research, chronicled in business case studies and documentaries, and is indelibly imprinted on generations of children by the iconic popularity of the Muppets. Forty years after the landmark study that led to the creation of *Sesame Street*, Sesame Workshop

and other benefactors have established the Joan Ganz Cooney Center to perpetuate Mrs. Cooney's vision in a new era. The Center is focusing its resources on the challenges children face today, asking the 21st century equivalent of her original question, "How can emerging media help children learn?" The inaugural focus of the Center will be on determining how the newer digital media — online, video games, cell phones, and other rapidly evolving content delivery platforms can help children develop strong literacy skills. Our focus includes the vital reading, speaking and listening capabilities that all children must develop as they enter school, as well as the 21st century literacies that students will need to compete and cooperate in a global, interconnected age. Today's children will be expected to demonstrate critical thinking, problem-solving, second language, inter-cultural, and media literacy skills that digital media may be uniquely suited to encourage.

The Center's program of work focuses on research, model and partnership development, and public dissemination. The report, *D is for Digital* by Cooney Fellow Carly Shuler is the first of a series of reports intended to promote a new dialogue about the focus and intentionality of children's learning in informal settings and in schools. Our mission is to examine the great untapped potential digital media can unlock if industry, researchers, educators and policy makers respond with vision and creativity. The study's findings are cause for both concern and optimism. While children are increasingly immersed in digital media, spending almost as much time with them as attending school, the number and availability of educationally oriented programs is not adequate. The report cites exciting new innovations in research and industry and recommends several action steps that those concerned with children's well-being must seriously consider. It is the Cooney Center's commitment to honor our founder's unique commitment to quality educational programming wherever and whenever children engage. It is time, once and for all, to put the vast wasteland in the rearview mirror.

MICHAEL LEVINE

Executive Director, Joan Ganz Cooney Center at Sesame Workshop

executive summary

From virtual penguins to video games, there are a plethora of digital products on the market that target a new generation of digital natives — children growing up immersed in media that shape the way they live and learn. Today’s children confidently roam rich virtual worlds, competently create content to share with their online peers, and easily navigate strategic video games via wireless, motion-sensing controllers. Experts have documented and parents believe that the new interactive media developed largely in the past decade represent a vital opportunity to leverage children’s interests to expand their skills and knowledge, but major concerns with the current market’s overall quality, developmental appropriateness, and educational value persist. This paper analyzes the children’s interactive media environment with a focus on mass marketed, informal learning products for children ages 3 to 11. It examines key factors influencing the environment, scans the current state of the market, and makes recommendations to inform research, production and policy to expand quality educational media for children.

MACRO-FACTORS

Macro-factors influencing the marketplace fall into two key categories, those that reflect children's media usage and those that reflect consumer market trends.

Children's Media Usage

1. Children are using digital media more often and at an earlier age, beginning to use electronic gadgets at age 6.7, as opposed to age 8.1 in 2005 (NPD, 2007).
2. Increasingly, children are multitasking, packing 8.5 hours of media consumption into 6.5 hours of time (Rideout et al., 2005).
3. Parents accept that children have become digital media consumers, with a majority believing that video games are a positive part of their children's lives (Entertainment Software Association, 2006), and that the Internet helps their children learn (Cable in the Classroom, 2007).

Consumer Market Trends

1. Children are flocking to virtual worlds, with four of the top five virtual world sites being youth-focused in June 2007 (Prescott, 2007).
2. The recent success of Nintendo's Wii has spawned significant investment in the casual gaming market.

3. Video content has become ubiquitous on the Web, with online video consumption rivaling all other major activities online in 2007 (Bieber et al., 2007).

4. Youth are generating their own content, and there are a host of new digital media products on the market designed to help them do just that.

5. Media convergence has never been more prominent, providing children with continuous round-the-clock access to content.

CURRENT STATE OF THE MARKET

Four industries constitute the bulk of digital media products that children consume: toys, video games, computer software and Web destinations.

1. *Toys*: Educational toys, referred to in the industry as Electronic Learning Aids (ELAs), represent a significant category within the \$22 billion toy industry.
2. *Video Games*: Very few educational video games that teach traditional school skills are available within the influential \$12.5 billion video game industry.
3. *Computer Games*: Though the \$1 billion computer game industry is smaller than the others examined for this report, both parents

and children accept computer games as a medium for learning, highlighted by the fact that the best selling children's *educational* computer games outsold the best selling *entertainment* games in 2006 (NPD, 2006).

IV. Web Destinations: Given the widespread acceptance of the Internet as a prominent and enduring form of media, it is not surprising that a multitude of Web destinations aim to educate while entertaining children.

RECOMMENDATIONS

This report concludes with recommendations for harnessing digital media to support children's learning divided into three key drivers of the marketplace: academic research, product development/media production and industry policy.

Academic Research

1. Set a research agenda that addresses the implications of market trends on product development. There are a number of trends outlined in this scan — ranging from multitasking to virtual world play — that are shaping the state of the children's digital media environment. Researchers should seek to understand the implications of these trends on children's informal learning, and address how developers can create responsible products

that can advance children's learning and healthy development.

2. Disseminate research findings to industry. Research conducted by academic scholars in the field of educational technology is rarely reviewed by the developers and producers of children's digital media. Research findings should be regularly disseminated to non-academics through industry publications and events.

Product Development/Media Production

1. Create educational video games for children, filling a gap in the market. Although casual gaming has emerged as a significant trend, there are very few educational video games on the market for this demographic. The top 20 children's game titles earned more than \$500 million in 2006 (NPD, 2006), a powerful incentive for industry leaders to consider while developing games with educational value.

2. Develop educational Web/toy hybrids, capitalizing on the popularity of virtual worlds. Although almost half of the ELA products identified through this scan utilize an additional medium (such as television), only one product hooks users into the Web. ELA producers should capitalize on the "virtual world phenomenon" by creating Web/toy hybrids that promote learning across platforms.

3. Break the traditional model of one child per screen in children's educational digital media.

The bulk of educational digital media products now on the market assume one child sitting alone in front of a screen; however, better learning takes place when an adult is present to scaffold the child's learning experience. With products that encourage group play, notably Nintendo's Wii, achieving mainstream commercial success, this is an opportune time to develop educational digital media products that encourage intergenerational interaction.

4. Leverage popular, entertainment-based digital media products for children's learning.

Many popular children's entertainment products can have significant educational value if used appropriately. Supplemental educational materials should be developed that guide parents and educators on how to adapt such products for children's learning.

Industry Policy

1. Create evidentiary standards to help make sense of products marketed as "educational."

This scan identifies a market replete with children's digital media products that advertise unsubstantiated educational claims. No voluntary or regulatory standards currently exist around marketing products as educational. Without firm and independently verified standards of educational value, how

is a parent or educator able to discern if products live up to their claims?

2. Protect children from digital age

commercialism. The emergence of immersive digital media products for children, such as virtual worlds, creates an unprecedented opportunity for commercial marketing. For children under the age of 12 who are highly impressionable, it is especially important to advance policies that safeguard them from commercial targeting in the digital age.

From virtual penguins to video games, there are a plethora of digital products on the market that target today's children — digital natives growing up immersed in media that shape the way they live and learn. These children confidently roam rich virtual worlds, competently create content to share with their online peers, and easily navigate strategic video games via wireless, motion-sensing controllers. However, the aptitude and engagement that children display when using digital media often stands in stark contrast to their ability to achieve in school. Shockingly, by the fourth grade, one-third of American children cannot read at grade level (Lutkus, Grigg, & Donahue, 2007). Given that children aged 8-10 spend nearly as much time interacting with media as they do in school, the nation shares not only a considerable opportunity but an urgent responsibility to leverage digital media for children's learning.

This responsibility cannot adequately be undertaken without first establishing the roles that digital media play in young people's lives. This report seeks to provide an up-to-date, reliable and unbiased scan of the children's digital media market, and to act as a benchmark for change as the nation moves forward through this digital age. An analysis of the children's digital media environment, the report begins with a broad view, examining macro-factors influencing the marketplace. It then narrows its focus to identifying products marketed as educational for children ages 3 to 11. Finally, it makes recommendations to promote the development of quality educational media products within the children's interactive media environment. Findings will be used by the Joan Ganz Cooney Center at Sesame Workshop (The Cooney Center) to further their mission of harnessing new media to advance children's learning.

DIGITAL KIDS

- Club Penguin was recently acquired by Disney for \$350 million (Barnes, 2007)
- Children ages 8 to 10 spend almost 6 hours per day interacting with media (Rideout et al., 2005)
- Webkinz traffic grew from less than 1 million to 6 million over the past year (Tihari, 2007)
- 84% of 8 to 10-year-olds live in a household with a video game player (Rideout et al., 2005)
- In June 2007, four of the top five virtual world sites were youth-focused, all rating higher than 'Second Life' and 'World of Warcraft' (Hitwise, 2007)
- The average 8 to 18-year-old lives in a home with "3.6 CD or tape players, 3.5 TVs, 3.3 radios, 2.9 VCR/DVD players, 2.1 video game consoles, and 1.5 computers" (Rideout et al., 2005)

definitions & research methods

DEFINING DIGITAL MEDIA

For the purposes of this analysis, the term Digital Media was limited to products that satisfy the following criteria:

- *Physically interactive*: Allows for, and responds to, physical input from the audience, thus excluding traditional media such as print and television¹.
- *Content-focused*: Incorporates originally produced content, thus excluding communication tools such as email and chat.
- *Informal*: Made available for purchase/consumption by any individual child or parent for use by children during their leisure time².
- *North American-specific*: Targeted at North American children ages 3 to 11.

This report builds on three key bodies of information: a literature review, expert interviews and the compilation of a database to track educational media products. These three sources are described below.

LITERATURE REVIEW

A literature review was conducted to evaluate the external factors that are affecting the industry. This scan encompassed both industry and academic sources. Trade journals, publicly available sales data, and articles from the mainstream press were reviewed throughout the summer and early fall of 2007. Additionally, relevant reports and studies published by university-based academic sources were examined.

INTERVIEWS

Over the summer and fall of 2007, The Cooney Center conducted interviews with more than 50 North American experts who are directly involved in the research, design and/or production of educational media for children. These respondents provided the expert perspective of professionals who are shaping the digital media environment for children. Though primarily conducted to inform the recent paper entitled *The Enduring Power of Pow! Wham!: Children, Digital Media & Our Nation's Future*, which outlines a research and policy agenda for leaders, analysis of these interviews proved very useful in supporting this environmental scan and analysis.

DATABASE COMPILATION

To enable a thorough review of the marketplace, researchers created a database of educational media products. This database does not assess the quality or effectiveness of any specific product, nor does it represent an exhaustive list of every product available. Rather, it provides a basis for analyzing the kinds of educational products available on the mass market. The database was coded by two judges. The average inter-judge agreement level across the set of categories coded was 93%: there were no significant differences between pair of coders. The methodology for compiling this database is described further in Section III: Current State of the Industry.

¹ Although television is an interactive medium in many ways, it was excluded from this study because much less is known about new technologies that are physically interactive.

² Products sold only to the school market, such as Scholastic's 'Read 180', were not included in this analysis. Although such products are certainly equally important in leveraging technology to further children's learning, the formal market was deemed as a completely separate industry and thus worthy of a separate analysis. The Joan Ganz Cooney Center at Sesame Workshop intends to conduct this analysis in 2008.

MIDDLE CHILDHOOD

More adept than preschoolers but less savvy than tweens, the approximately 20 million American children in the age span from 6 to 11 have a set of psychological, social/emotional, moral and environmental concerns that is all their own.

Typically, children in this age span:

COGNITIVE

- Strengthen their capacity for remembering, imagining, logical reasoning, problem solving and critical thinking.
- Become more reflective — that is, better able to access, reflect upon, and talk about their own thoughts and feelings and to describe themselves in complex ways.
- Focus on activities for longer periods of time.
- Communicate easily, using language effectively in a wide variety of situations.

SOCIAL/EMOTIONAL

- Begin to negotiate a wide range of social interactions without adult help and to establish relationships that are not extensions of their parents' networks.
- Form stronger, more complex relationships, particularly with peers of the same sex, and grow in their desire to be liked and accepted by friends.

- Gain the ability to play and learn in teams or groups.
- Begin to create social hierarchies and a sense of "groupness."

MORAL

- Begin to form a consistent set of values that guides their behavior.
- Strengthen their sense of right and wrong, understanding and adhering to social norms.

ENVIRONMENTAL

- Continue to be strongly influenced by their families' values and routines.
- Start and finish elementary school, spending about 7 hours per weekday in a school environment.
- Spend significant stretches of time immersed in media, often "multitasking."

Sources:

Cognitive Skills Group, Harvard Project Zero. (1997). *Development Overview*. Presented on T-543 Web site at Harvard Graduate School of Education
Carnegie Corporation of New York. (1996). *Years of Promise; A Comprehensive Learning Strategy for America's Children*. New York, NY.
Rideout, V.J., Roberts, D. & Foehr, U. (2005). *Generation M: Media in the Lives of 8 — 18-year-olds*. Menlo Park, CA: Henry J. Kaiser Family Foundation.
National Center on Birth Defects and Developmental Disabilities. (2005). *Middle Childhood (6 to 8 years old) and Middle Childhood (9-11 years old)*. Available at: <http://www.cdc.gov/ncbddd/child/default.html>



II. macro-factors influencing the industry

The children's interactive media environment does not exist in a vacuum. A number of factors hold influence over its evolution. To develop educational media relevant to today's children, it is fundamentally important to pay close attention to these powerful contextual influences. The most influential macro-factors shaping the children's interactive media environment fall into two areas: children's media usage and consumer market trends.

children's media usage

Today's children are growing up in a world where digital media is the norm. They have computers in their homes, 500 channels on their televisions, and virtual friends they have never met in person. In this media-rich environment, the major evolutions in media usage are: children are using media more frequently and at earlier ages, increasingly engaging in media multitasking and receiving acceptance for their media consumption from their parents.

CHILDREN ARE IMMERSSED IN DIGITAL MEDIA, USING IT MORE OFTEN AND AT AN EARLIER AGE

Youth often represent the earliest adopters of media products, helping turn innovative products such as PlayStations, iPods and YouTube into mass market success stories. Although the stereotype for early adopters tends to be a teenage boy, it is not uncommon to see an 8-year-old girl walking down the street completely 'wired' — cell phone tucked into her back pocket, listening to her iPod, playing her Nintendo DS with a Webkinz clipped onto her backpack. Meanwhile, her 3-year-old sister plays video games on a LeapFrog video game system at home, while her infant brother watches Baby Einstein videos in the next room. Increasingly, children are using digital media more often and at an earlier age:

- Children, on average, are beginning to use electronic gadgets at age 6.7, as opposed to age 8.1 in 2005 (NPD, 2007).
- More than one-third of kids are spending more time playing video games now than they did one year ago (NPD, 2007).
- Children ages 6 to 8 spend 75% more time gaming than they used to (NPD, 2007).
- Children ages 8 to 18 spend an average of nearly 6.5 hours with media every day (Rideout et al., 2005).
- The typical 8 to 18-year-old lives in a home with "an average of 3.6 CD or tape players, 3.5 TVs, 3.3 radios, 2.9 VCR/DVD players, 2.1 video game consoles, and 1.5 computers." (Rideout et al., 2005)
- The average 8 to 10-year-old spends (Rideout et al., 2005):
 - 1:05 hrs/day playing video games
 - 0:59 hrs/day listening to music
 - 0:37 hrs/day on the computer
 - 3:17 hrs/day watching television.

DIVERSITY AND DIGITAL MEDIA

Today's children are more diverse than any generation in American history (America's Children, 2007). There are some differences in the amount of time spent with media amongst racial and socio-economic groups.

- African American youth spend the most time with TV, videos/ DVDs, and movies, followed by Hispanic and then White youth.
- African American youth are more likely than White youth to report bedroom televisions, DVRs, cable/satellite TV connections, subscriptions to premium TV channels, and video game consoles.
- Internet access has become commonplace among most children from the major racial and socio-economic groups, but a divide in the quality and nature of that access still exists.
- Youth whose parents completed some college report less exposure to screen media than either youth whose parents completed no more than high school or youth whose parents finished college.

Note: Youth refers to children aged 8-18
Source: Rideout et al., 2005

INCREASINGLY, CHILDREN ARE MULTITASKING

“You just multitask... My parents always tell me I can't do homework while listening to music, but they don't understand that it helps me concentrate.”

This quote comes from a 14-year-old girl interviewed for the recent *Time* magazine cover story, “The Multitasking Generation,” that debates the effects multitasking is having on youth. What is not up for debate is that today's children are, without question, multitasking en masse:

- Roughly a quarter (26%) of the time young people are using one medium, they're doing something else media-related at the same time (Rideout et al., 2005).
- Children pack 8.5 hours of media consumption into 6.5 hours of time (Rideout et al., 2005).
- Just under one-third (30%) of young people say they either talk on the phone, instant message, watch TV, listen to music, or surf the Web for fun “most of the time” they're doing homework. Another third (31%) say they do so “some” of the time (Rideout et al., 2005).
- A four-year study of modern family life conducted by UCLA's Center on Everyday Lives of Families found multitasking to be

one of the most dramatic areas of change since a similar study was conducted 20 years ago (Wallis, 2006).

PARENTS ACCEPT THAT THEIR CHILDREN HAVE BECOME DIGITAL CONSUMERS

For the first time in history, children are growing up with parents who themselves grew up immersed in digital media. The 10-year-old child who once obsessively played PONG on an Atari now has a 10-year-old child who obsessively plays Super Mario Galaxy on a Wii. Different game. Different platform. Same obsession. So it is not surprising that many young parents have a special appreciation for the prominence of digital media in their children's lives, accepting and encouraging digital media consumption:

- 61% of parents believe video games are a positive part of their children's lives (Entertainment Software Association, 2006).
- 80% of “gamer” parents report playing video games with their children (Entertainment Software Association, 2006).
- 74% of parents feel that video games are a part of their family's life and are very comfortable with this idea (Wireless News, 2006).
- 81% of parents recognize that the Internet helps their children learn skills and information needed to succeed in school (Cable in the Classroom, 2007).
- 70% of casual gamers report seeing casual games as providing valuable educational benefits (PopCap Games, 2007).

consumer market trends

When a product or technology becomes trendy, it has the potential to influence development of an entire industry. The literature scan and expert interviews identified five market trends shaping children's digital media and exhibiting excellent potential for advancing children's informal learning. These trends are: the virtual world phenomenon, casual games as serious business, video content on the Web, youth-generated content, and media convergence.

TREND: THE VIRTUAL WORLD PHENOMENON

Children's online virtual worlds — simulated environments in which users inhabit and interact with each other via digital representations of themselves called avatars — have become immensely popular. Visits to such sites have grown 68% in 2007, according to online measurement company Hitwise (Prescott, 2007). Most surprising, Hitwise's June 2007 ranking of virtual worlds revealed that youth-focused sites (webkinz.com, clubpenguin.com, stardoll.com, habbo.com) held four of the top five spots, rating higher than popular, adult-oriented equivalents, *Second Life* and *World of Warcraft*³. These sites are not only popular, but many are also commercially successful. Disney recently acquired Club Penguin for \$350 million (Barnes, 2007), and the Webkinz dolls earned more than \$45 million in U.S. retail sales in 2006 (Tihari, 2007).

The overwhelming commercial success of such Web destinations has encouraged others to jump in, resulting in the emergence of an entirely new category — Web/toy hybrids. MGA Entertainment recently launched Be-Bratz.com, a virtual world unlocked via a USB key disguised as a necklace sold with new Bratz fashion dolls. Mattel's BarbieGirls.com, which touted 4 million registered users within three months of its launch and is growing by an

average of 45,000 girls per day, is capitalizing on this growth with the debut of a Barbie-like figure that unlocks new content within the virtual world. These sites include a number of features, such as user-customizable avatars, in-world economies, bubble-chats, games and simulations. What about these sites resonates so strongly with today's children?

In the recent *New York Times* article "Doll Web sites drive girls to stay home and play," MIT Professor Sherry Turkle explains why she believes virtual worlds are so popular amongst children. "For young people, there is rather a kind of fluid boundary between the real and virtual world, and they can easily pass through it," she said. Though understanding why virtual worlds resonate so strongly with children will require additional research, this phenomenon has definitely taken hold for the foreseeable future. Some prominent industry leaders are already looking to harness the power of virtual worlds for the purposes of education.

For example, IBM has recently teamed up with the children's production company Zula USA to create a new virtual world aimed at inviting kids into math, science and technology. The site, scheduled for a December 2007 launch, is an immersive world built around the CGI series Zula Patrol. Designed to appeal to children in the pre-kindergarten-to-grade-three range, it will layer content

³ Note — the Hitwise data featured is based on U.S. market share of visits, which is the percentage of online traffic to the domain or industry, from the Hitwise sample of 10 million U.S. Internet users. Hitwise measures more than 1 million unique Web sites on a daily basis, including sub-domains of larger Web sites. Hitwise categorizes Web sites into industries on the basis of subject matter and content, as well as market orientation and competitive context.

to meet the developmental needs of kids at different stages. Sesame Workshop recently launched the new virtual world Panwapa (panwapa.com), with the assistance of Merrill Lynch and Company, which immerses children “in a unique and novel exploration of self, community and cultures from around the world.” The site translates children’s

experiences in the virtual world into actions in the real world, encouraging global citizenship, financial literacy, language skills and cultural knowledge among children worldwide. Virtual worlds have proven entertaining and engaging; we now need to spur the development of virtual worlds grounded in pedagogy and research.

EXAMPLES OF VIRTUAL WORLDS FOR CHILDREN	
barbiegirls.com	The Barbie Girls world is designed to be a safe, fun, and exciting place for girls to play online. Once a girl has registered with the site, she can create a virtual character, design her own room, shop with B Bucks (virtual “money”) she earns, play games, watch videos featuring her favorite Barbie movies and products, and have real-time chats with other registered users.
be-bratz.com	Be-Bratz.com is a safe interactive virtual world designed specifically with the Bratz fan in mind. At Be-Bratz.com your child can express her/himself, be creative, have fun and connect with friends. Interacting with Bratz is a fun way to learn about individuality, friendship, loyalty, sensitivity to others and much more.
cartoondollemporium.com	Cartoon Doll Emporium (CDE) is an online destination for girls ages 6 - 16. It features more than 800 original, hand-drawn dress-up games, quizzes, arcade games, cute picture galleries, music, graphics, contests, and one of the most unique chat forums on the Web.
clubpenguin.com	Club Penguin is a kid-friendly virtual world where children can play games, have fun and interact with each other. Kid-friendly chat, Lots of fun games, Nothing to download, Lots more!
cyworld.com	Cyworld is a whole new way to connect with the people in your world. Here you’ll find friends you know, new people to meet, clubs to join and special spaces for your photos, artwork, journals and more. In Cyworld, you can meet up, hang out, play, dream and share your world like never before.
habbo.com	Habbo Hotel is a virtual community where you can hang out with friends, design your own unique space and create your own games and competitions.
myepets.com	MyePets.com is a safe interactive virtual world designed specifically with the MyePets fan in mind. At MyePets.com your child can express her/himself, be creative, have fun and connect with friends. Interacting with a MyePet is a fun way to learn about individuality, responsibility, friendship, loyalty, sensitivity to others and much more.
neopets.com	Neopets is a fun virtual pet site. You can create your own pets (up to a maximum of 4), feed them, groom them, look after them, and watch them grow. You can also chat to other people, play games, create your own Web pages, send NeoMail, and lots more.
nicktropolis.com	Nick.com’s amazing new 3D world is here! In Nicktropolis you can create your own room, connect safely with friends, play games and even hang out with your favorite Nicktoons in their ‘hoods!
panwapa.com	Panwapa, created by the educational experts behind <i>Sesame Street</i> , is a multimedia, global initiative that is designed to inspire and empower a new generation of children, ages four to seven, to be responsible global citizens. Research based materials come in a range of media platforms, including online, video, and print.
stardoll.com	Stardoll is a paper doll dress-up community where you can create your own doll or choose from our always growing collection of celebrity dolls and dress them up in our virtual fashions. Every celebrity doll has a wardrobe full of unique clothes and outfits, each month there are new and there are new dolls released every week.
vmk.com	Disney’s Virtual Magic Kingdom (let’s just call it VMK) is an online multi-player game. You get to create your own character and check out amazing lands, play action-packed games and even decorate your own personal room with cool virtual stuff. Plus, you can meet tons of other VMKers from around the world.
webkinz.com	Webkinz pets are lovable plush pets that each come with a unique Secret Code. With it, you enter Webkinz World where you care for your virtual pet, answer trivia, earn KinzCash, and play the best kids games on the net!
weeworld.com	WeeWorld is a social network built for fun where you can meet and interact with WeeMees, invite friends, send messages, play games and create your own online cartoon page. What’s a WeeMee? It’s a cartoon that looks just like you. Think of it as your own personal avatar or icon.
NOTE: Descriptions copied directly from Web sites.	

TREND: CASUAL GAMES ARE SERIOUS BUSINESS

For the first time in over a decade, Nintendo is winning the highly competitive console war, beating rivals Sony and Microsoft in both home-console and handheld markets. Nintendo's recent strategy has focused on enticing mass market consumers to engage in casual gaming rather than catering to the stereotypical audience of hard-core gamers. In describing this approach, renowned Nintendo game designer Shigeru Miyamoto has said, "Obviously, graphics are what the other two companies are doing. I think what we'll do for Wii is show people open interaction... We're designing a system that's

"We're designing a system that's relevant to everyone in the house."

relevant to everyone in the house. Our hope is that Wii will be something different" (Morris, 2006). Nintendo's innovative strategy and resulting commercial success has confirmed the potential of the casual gaming market.

Game developers, publishers and licensors have taken notice of Nintendo's success, leading to substantial investments in the development of children's casual games. Nickelodeon Kids and Family Group has pledged to invest \$100 million over the next two years to develop and distribute casual

gaming sites and platforms, beginning with their new preschool casual gaming space, MyNoggin (mynoggin.com). Electronic Arts (EA) and Hasbro have entered into a strategic six-year licensing agreement that grants EA the exclusive worldwide rights to create digital games based on Hasbro properties such as Monopoly and Scrabble. Disney is launching DGamer, a new online social networking initiative that will be bundled with all Disney Interactive Studios' Nintendo DS games starting in May 2008. This trend toward casual gaming is not only opening the video game world to younger users, but it has spawned a new movement toward intergenerational family gaming.

Electronic Arts has announced the Family Play system, a choice of control method, scheduled for introduction in the Wii versions of popular titles such as Madden NFL '08, NBA Live '08 and FIFA '08. Microsoft's Electronic Entertainment Expo (E3) announcements of Disney movie downloads and new games aimed at families reflect its effort to broaden the family appeal of its Xbox 360 game console. Steven Spielberg has collaborated with Electronic Arts on a puzzle game designed for Nintendo's Wii console. In an interview with *Newsweek* magazine, Spielberg said the puzzle game "seemed like a great thing for the entire family to play together over Christmas; although you don't need the excuse of a holiday to enjoy it."

The use of video and computer games for education is not a new topic. In the past, games have helped players learn how to control pain, train soldiers on how the military works, and teach students how to be successful activists on a college campus. They have proven to help struggling readers make significant literacy progress in school (Schwartz, 1988, as cited in Mitchell & Savill-Smith, 2004), increase students ability to retain information (Randel et al., 1992, as cited in Mitchell & Savill-Smith, 2004) and enhance learner self-esteem (Ritchie & Dodge, 1992; Dempsey et al., 1994, as cited in Mitchell & Savill-Smith, 2004). What *is* new are the opportunities for education that the casual and family gaming boom have opened up. Educational games can now reach children and their families at home.

A NEW (Wii)NNER OF THE CONSOLE WAR

- The Nintendo Wii, distinguished mainly by its unique motion-sensing wireless controller, has sold over 13 million units of hardware and 65 million pieces of software worldwide (Nintendo, 2007).
- The Nintendo DS, a handheld system featuring two LCD screens, has sold over 50 million units of hardware (Nintendo, 2007), making it the fastest-selling handheld game console of all time (Rivington, 2007).

TREND: VIDEO CONTENT ON THE WEB

Labeled ‘the year of the video,’ 2007 has witnessed online video consumption rival all other major activities online (Bieber et. al., 2007). Investment bank Piper Jaffray’s recent analyst report describes pivotal evolutions in video distribution, outlining more than 15 major content partnerships signed since 2006. According to a recent comScore survey, three-quarters of U.S. Internet users watched an average of three hours of online video during July, resulting in an estimated total viewing of more than nine billion videos during that month (comScore, 2007). Although the top three video sites for video consumption are adult-oriented, youth-focused Viacom Digital and Disney Online rank fourth and fifth with 281 million and 182 million video streams respectively, indicating that children are looking to consume videos online (comScore, 2007). This fall, children’s media producers are responding to this trend with new product offerings designed to entice young viewers.

PorchLight Entertainment’s new YouTube inspired Web site, Kid Videos (kidvideos.com), is an online environment that allows and encourages children to “watch and upload amateur videos, add them to a favorites list, send them to friends, and post/read comments on them.” Whether this “YouTube for kids” will achieve anywhere close to the success of its grown-up counterpart remains to be seen. But it is not just user-generated content that

children are watching online. Television show creators are offering up much of the content that they spend millions of dollars producing on the Internet.

Taffy Entertainment's kabillion.com now offers an entire block of children's programming. MTV Networks recently announced that it will launch two dozen new Web sites targeted at letting users view clips from shows, pouring \$500 million into this initiative. And at Disney XD, the new home of Disney Channel broadband, kids can watch videos ranging from full episodes of popular shows like Hannah Montana to clips of the updated evergreen preschool property Mickey Mouse Clubhouse. With a smorgasbord of videos being made available to children online, we run the risk of the Internet turning into the 'vast wasteland' that television was once famously labeled by then Federal Communications Commissioner Newton Minow in the 1960s. To avoid this, the amount of high-quality educational videos available to children online needs to be maximized. In 2008, Sesame Workshop will launch an exciting new broadband site that makes Sesame's entertaining and educational video available online. Since the debut of *Sesame Street* in 1969, significant resources have been invested in well-researched, curriculum-based and entertaining children's educational television programming. The explosion of video content on the Web now provides a medium to revitalize, reuse and expand a remarkable library of educational content.

TREND: YOUTH-GENERATED CONTENT

User-Generated Content (UGC) has unquestionably reshaped the Internet, lying at the core of Web 2.0. Though content produced by end users — such as wikis, blogs and podcasts — originated with adults, the UGC trend is increasingly growing younger. As of 2005, more than 50% of teens had created media, and over 30% of internet-using teens had shared such media online (Lenhardt & Madden, 2005). Not surprisingly, younger children aspiring to be like their older siblings are becoming content creators themselves. In 2007, a host of new children's television shows, toys and Web destinations have launched to help them do just that.

Nickelodeon is integrating UGC into its new sitcom *iCarly*, which invites elementary and middle school children to send in videos showcasing their "unique talents, weird skills and homemade animated shorts." The show attracts 2.8 million viewers a week on TV and 1.4 million viewers online (Hampp, 2007). To ease the process of content creation for kids, ToyQuest is launching RipRoar Creation Station, an electronics/toy hybrid that comes with everything a child needs to produce their own short movie and upload the project directly to YouTube or any other online video sharing site. On the new Web start-up Kerpoof (kerpoof.com), kids can "create art, stories and animated movies using a simple 3D interface, and when done, can save it to their gallery, share it with others, and vote on their

favorites.” And since releasing the ‘Habbo Wood MovieMaker’ tool to its online community in early September, members of youth-oriented virtual world Habbo Hotel (habbo.com) have created more than 610,000 in-game movies (KidScreen, 2007).

Academic leaders in the field, such as Dr. Yasmin Kafai of the UCLA Graduate School of Education, have already started to examine the capacity of UGC as an outlet for learning. Fan fiction (stories about well-known characters written by fans of the original work) provides a strong example of how learning naturally occurs when children are creating content.

“these language writers are in production mode, not just recognition mode.”

As Dr. Kafai articulated, when children are creating fan fiction, “these language writers are in production mode, not just recognition mode.” Fan fiction once represented a niche endeavor, but now has a mainstream audience. One site devoted to Harry Potter fan fiction has over 42,000 stories and receives over 40 million hits per month (harrypotterfanfiction.com). Given that creation is a natural outlet for learning and that UGC is extremely popular amongst children, developers of children’s educational digital media should seek to incorporate UGC into their products.

TREND: MEDIA CONVERGENCE

Not long ago television programs broadcast solely to TV sets, music programs broadcast to radios, and movies showed only in theatres. But today, people access TV shows on their cell phones, radio on the Internet, and movies on their iPods. Media convergence — the merging of capabilities of individual media channels — has gathered steam consistently over the past decade, but never has it been more prominent in the mass market than today. Apple’s pop-culture sensation, the iPhone, recently selected by *Time* magazine as the invention of the year, highlights this trend. The iPhone, which has sold 1.39 million units since the product launch in July (CNNMoney.com, 2007), features a camera, a portable media player, text messaging, visual voicemail, email, Web browsing and local Wi-Fi connectivity. Media convergence not only enables the growth

ELMO ON THE GO

Not every family in the U.S. owns a computer, but a great majority has at least one cell phone. Are phones a good way to get literacy tips to parents and appealing content to children? In 2006, Sesame Workshop conducted a study on this very question and asked independent evaluators to analyze the results. Eighty families representing a variety of locations in California and income levels participated, and received on their cell phones parent-directed literacy tips presented by *Sesame Street*’s Maria, followed by Elmo introducing the Letter of the Day and a clip from the *Sesame Street* archives. Three to four times a week, over a period of eight weeks that the study was conducted, parents were asked to watch the literacy tip and then stream the new letter video for their preschoolers to watch.

The results indicated that cell phones do hold promise as an educational platform for literacy content. Parents said that after undergoing the study, they were more likely to initiate literacy activities with their kids. The children were, for the most part, eager and excited to view the clips — one parent recounted that whenever the phone rang, her children came running, hoping the call was from Elmo. (Horowitz et.al., 2006)

of a “multitasking generation,” but it also helps provide children with continuous round-the-clock access to their favorite media content.

As the growth of video content on the Web demonstrates, convergence is certainly evident on the Internet where technology for streaming audio and video is evolving rapidly. Children can watch clips of their favorite shows and interact with their favorite characters via multi-modal online games. However, convergence is also increasingly visible in mobile devices such as cell phones and iPods. The Walt Disney Internet Group recently launched a mobile phone version of Disney.com that allows users to access the world of Disney on their cell phones. The site will feature information on Disney movies, TV shows, music and games. *Sesame Street* podcasts, available for download on both their Web site and iTunes, received the number one spot on iTunes the week after their September launch. Media content on mobile devices does not necessitate a passive viewing experience. Juniper Research recently identified the mobile games market as “ready to explode,” with an estimated market value of \$3 billion this year, growing to \$10.5 billion in 2009 (Gibson, 2005). Media convergence has great potential for the delivery of educational content, allowing for multi-platform educational initiatives that were never before possible and enabling a 360-degree approach toward educating and reaching children.

PBS Kids is attempting to capitalize on this potential through their Next Generation Initiative, which involves increasing their investment in children’s educational content for multiple media platforms. Additionally, the U.S. Department of Education’s Ready to Learn Initiative, which has funded some of the country’s most effective and beloved children’s educational television programs such as *Sesame Street* and *Between the Lions*, has prioritized testing “new ways for kids and parents to view programs — for example, on the Internet, or with handheld devices, mobile phone, and other emerging technologies.” Commercial corporations in the children’s media space should follow PBS’s lead, leveraging technological advancements to provide educational media. As Susan Neuman of University of Michigan stated in a recent interview, “When you use multiple media to bootstrap children’s learning, you see gains.”

“When you use multiple media to bootstrap children’s learning, you see gains.”

UNIVERSITY-BASED RESEARCH AND DEVELOPMENT

Academic projects can and should be used to spawn mass market products that are engaging, educational and well researched. An inspiring example began at MIT when researchers from the Lifelong Kindergarten group collaborated with the popular children’s toy company The LEGO Group to create the world’s first “programmable bricks.” By squeezing computational power into LEGO bricks, children (and adults) are able to build robots and other automated or interactive systems, providing a fun and engaging tool to help teach science, technology, engineering and math. This project led to the LEGO MINDSTORMS robotics kits used by millions of people around the world. Though most academic projects are not intended to turn into mass market products, developers can and should look to them for innovative and well-researched examples of the potential of educational technology. Outlined below are six innovative academic projects that industry should look to for examples of how emerging media can be used to develop products that are both fun and educational.

PROJECT	DESCRIPTION	COLLABORATORS
Scratch	Scratch is a new programming language that makes it easy to create your own interactive stories, animations, games, music and art — and share your creations on the Web. Scratch is designed to help young people (ages 8 and up) develop 21st century learning skills.	Developed by the Lifelong Kindergarten group at the MIT Media Lab, in collaboration with the UCLA Graduate School of Education and Information Studies, with financial support from the National Science Foundation, Intel Foundation, and MIT Media Lab research consortia. (scratch.mit.edu)
River City	River City is an interactive computer simulation for middle grades science students to learn disease transmission and scientific method. It has the look and feel of a video game but contains content developed from National Education Science & Technology Standards and 21 st Century Skills.	Principal investigator is Dr. Chris Dede from the Harvard Graduate School of Education, working in collaboration with Arizona State University’s Educational Technology Graduate Program. Financial support comes from the National Science Foundation. (muve.gse.harvard.edu/muvees2003)
Crickets	Crickets are small programmable devices that can make things spin, light up, and play music. With Crickets, you can create musical sculptures, interactive jewelry, dancing creatures, and other artistic inventions — and learn important math, science, and engineering ideas in the process. For example, you can make a cat and program it to purr when someone pets it. Or you can make a birthday cake and program it to play a song when someone blows out the candles.	Developed and researched by Mitchel Resnick’s Lifelong Kindergarten group at the MIT Media Lab, based on more than a decade of NSF-funded educational research. Refined in collaboration with the Playful Invention and Exploration museum network, sold through the Playful Invention Company. (llk.media.mit.edu/projects.php?id=1942)
Handheld Augmented Reality Project (HARP)	HARP is an “augmented reality” game designed to teach math and science literacy skills to middle-school students. The game is played on a Dell Axim handheld computer and uses Global Positioning System (GPS) technology to correlate the students’ real world location to their virtual location in the game’s digital world. As the students move around a physical location, such as their school playground or sports fields a map on their handheld displays digital objects and virtual people who exist in an augmented reality world superimposed on real space.	Funding from a U.S. Department of Education Star Schools Program grant. Developed by researchers at the Harvard Graduate School of Education (led by Professor Chris Dede), the University of Wisconsin at Madison, and the Teacher Education Program at MIT (led by Professor Eric Klopfer). (sites.harvard.edu/icb/icb.do?keyword=harp)
Gamestar Mechanic	Gamestar Mechanic is a game designed to teach young people about game design, with emphasis on design, not programming. The goal is to help young people — gamers and nongamers — learn what it is like to think about design and to think like a designer.	Gamestar Mechanic is a collaboration between a highly innovative game company, the Gamelab in New York, and the Games, Learning, and Society (GLS) Group at the University of Wisconsin-Madison (formerly the GAPPs Group). Wisconsin leads: Elisabeth Hayes, James Paul Gee, Kurt Squire, Alex Games; New York leads: Katie Salen, Eric Zimmerman, Robert Torres. The project is funded by The MacArthur Foundation digital media and learning initiative. (www.gamelab.com)
Labyrinth	Labyrinth (working title) is an online puzzle adventure game, designed to promote math and literacy learning, and is targeted at middle-school students. The game will be served from Maryland Public Television’s Thinkport Web site. Teams of students will collaborate on solving the puzzles that make up the game’s core activity. These puzzles will address pre-algebra, with an emphasis on ratio, proportion, number sense, variables, data, and geometry. The story, delivered in graphic novel format will support literacy goals, as will the challenge of communicating with teammates about problem-solving strategies.	This product is a collaboration between The Education Arcade, Maryland Public Television, Fablevision, Johns Hopkins University, and Macro International. Labyrinth is funded by the U.S. Department of Education through a Star Schools grant. (educationarcade.org/labyrinth)

Note: All project and collaborator descriptions above are copied directly from the individual project Web sites



III. current state of the industry

To fully understand the children's interactive media environment as it applies to learning, we need to recognize not only the macro-factors shaping the environment, but also the specific products that are on the market today. What is available for a typical parent or child searching for an educational media product? This section narrows the focus of the paper, scanning products that are specifically marketed as educational. It focuses on four industries that constitute the bulk of interactive digital media products that children consume: toys, video games, computer software and Web destinations.

toys/electronic learning aids (ELAs)

With the amount of buzz surrounding children using products such as the Wii, iPods and Club Penguin, toys may seem like a thing of the past. But playing with toys is still the second largest leisure activity for children aged 2-12, surpassing activities such as playing video games, listening to music and using a computer (TIA Report, 2006). However, if the term 'toy' arouses images of basic blocks and static dolls, try browsing the aisles of your local toy store. Today's blocks are "smart," such as LEGO MINDSTORM's NXT, an intelligent brick with a 32-bit processor. Dolls such as Ganz's Webkinz turn into virtual companions that unlock rich online environments. And today's Rubix Cubes are a "Rubix Revolution," featuring fast-paced electronic games, multiplayer gaming, lights and sound effects. Youth electronics is one of the fastest growing toy categories, expanding 22% in 2006 and contributing \$1 billion to the \$22 billion toy industry (NPD, 2006). Seven of the 12 toys selected by *Toy Wishes* magazine as the 'Hot Dozen' heading into the holiday season have a screen or a monitor, compared to only two last year. All of these electronic toys are focused on pure fun. However, over the past decade, the industry has experienced an influx of electronic toys that tout a multitude of educational benefits, referred to as Electronic Learning Aids (ELAs).

In 1995, a Stanford University graduate realized that there were no products on the market that could help his struggling son learn to read, so he founded a toy company that focused solely on the design, development and marketing of innovative, technology-based learning products with an emphasis on basic literacy and math skills. This company, LeapFrog Enterprises, launched a product called the LeapPad in 1999. The device, which resembled a talking book, was the best selling toy in specialty stores in 2001 and 2002. By 2003 sales had reached over \$680 million (McHugh, 2005). The success of LeapPad helped LeapFrog Enterprises become one of the fastest growing toy companies in history, and helped evolve the ELA toy category into the significant industry it is today.⁴

THE ELA MARKET

To identify what a typical child or parent would encounter if searching for an educational toy, the Web sites of the top three toy retailers — Wal-Mart, Target and Toys R Us — were examined in September 2007. Identifying ELAs proved easy, as each retailer had a dedicated section. All digital media products listed in this category were included in the database.

Outlined below are the key findings of this scan:

- 88 ELA products were identified. The products were broken down into 7 different categories as outlined in Chart 1. (See the

chart “Examples: Educational Toys” on P. 31 for product examples from many of these categories). The most prominent types of ELAs on the market today are activity laptops and hardware/software systems. Activity laptops, such as VTech’s Nitro Notebook, are toys that look and feel just like a real laptop computer, but have built-in learning content. ELA hardware/software systems are toy products that rely on some type of hardware console that works with corresponding software. The play pattern on toys, such as the LeapFrog Leapster, is often very similar to that of traditional video game systems such as a

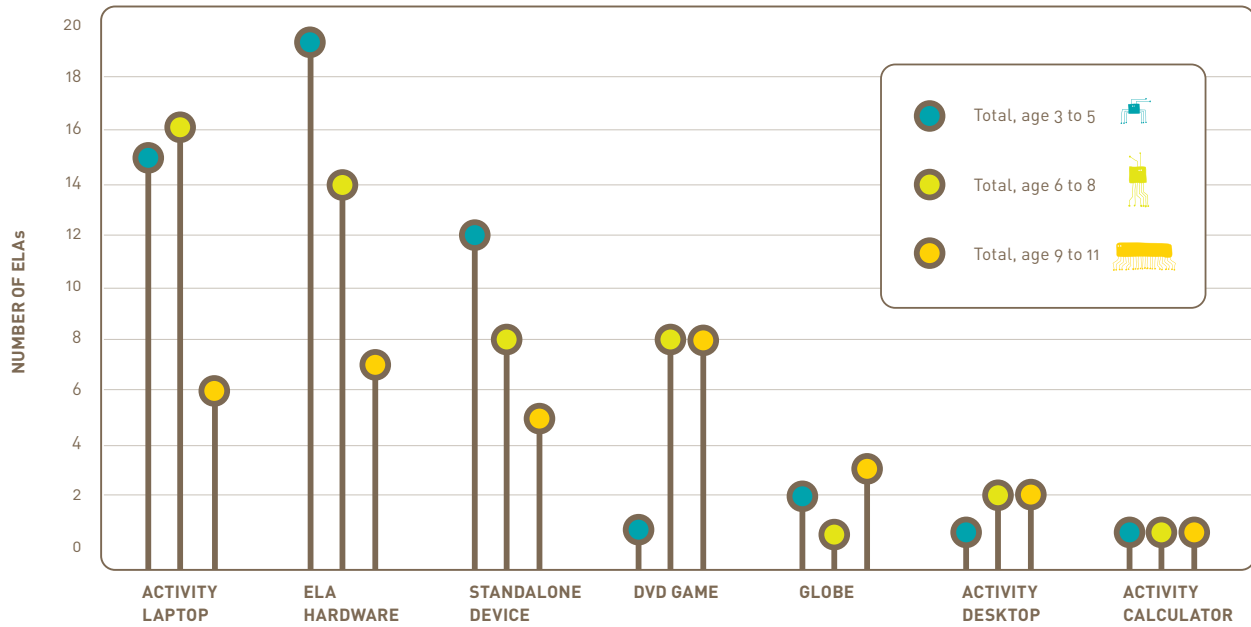
CATEGORY	TOTAL (%)	TOTAL (#)
Activity Laptop	30	26
Hardware/Software System	28	25
Standalone Device	19	17
DVD Game	11	10
Globe	6	5
Activity Desktop	3	3
Activity Calculator	2	2
GRAND TOTAL	100	88

[Chart 1]

Playstation. These products were coded as “hardware/software systems.” If the corresponding software had been counted separately, these products would actually account for a much larger proportion of the ELA toy category than indicated here

⁴ Since going public in 2002, LeapFrog has experienced some difficulty competing against competition such as Fisher-Price, Mattel and VTech. In October 2007, the company reported a drop in third-quarter sales, but a narrowed loss for the period. Despite recent financial stress, LeapFrog is committed to the design, development and marketing of innovative, technology-based learning products.

number of ELAs per category
 (Total = 88)



(Chart 2)

as some hardware products have dozens of associated software products.

- The number of ELAs available is significantly lower for children aged 9 to 11 than children in the younger age groups. As indicated in Chart 2, this trend is particularly prominent in the Activity Laptop, ELA Hardware and Standalone Device categories.
- LeapFrog and VTech are the major players in the ELA category, although 18 different companies were identified in total.
- As illustrated in Chart 3, all toys were tagged for whether or not they require an additional medium for use, and what

type of medium was required. Almost half of all toy products identified (40%) require usage of an additional medium. The most common additional medium is TV. Only 3% of the ELAs that use an additional medium (or 1 toy) require usage of the Internet.

MEDIUM	TOTAL (%) (N=32)
TV	59%
Computer	22%
DVD	16%
Internet	3%

(Chart 3)

PRODUCT EXAMPLES

In order to properly understand the type of ELAs available on the market, examples were chosen from each of the top ELA categories: Activity Laptops, ELA Hardware and Standalone Devices. These examples were selected to present a representative view of the types of ELA products available on the market.

EXAMPLES: EDUCATIONAL TOYS (ELAs)				
PRODUCT PICTURE	PRODUCT & COMPANY	CATEGORY	TARGET AGE GROUP*	DESCRIPTION**
	SMART CYCLE Physical Learning Arcade System by Fisher-Price	Hardware/Software System	3 to 6 years	It's a stationary bike, a learning center, and an arcade game system—all rolled into one! Smart Cycle plugs right into your TV, ready to take kids on learning adventures like no other. As they pedal, favorite character friends guide them through learning discoveries, games, and even exciting races. Bring the arcade experience home, with multiple levels of play for different ages and stages!
	Leapster Learning Game System by LeapFrog	Hardware/Software System	4 to 10 years	The Leapster Learning Game System teaches in the way your child loves to play. With the Leapster and Leapster L-Max library of software titles, your child can play action-packed educational games featuring characters that they know and love. The interactive touch screen and pen allow your child to write, draw, and paint, while vivid animation lets them learn essential school skills with story-based games.
	Hooked on Phonics Touch Screen Learner by Zizzle	Standalone Device	4 years and up	The Touch Screen Learner features an interactive LCD screen and 14 different learning games for your child to master. Each game reinforces the fundamental building blocks of reading: letter names, phonemes, beginning spelling, and rhyming. Bonus games are unlocked as your child succeeds encouraging them to collect more points as they learn!
	Nitro Notebook by VTech	Activity Laptop	5 to 7 years	With its cool look and design, Nitro Notebook is power-packed with learning tools — and fun. Kids choose from 80 arcade-style games to learn math, reading, Spanish, logic, music and more. Nitro Notebook even reads stories aloud to teach phonics and build comprehension skills. Artificial Intelligence technology tracks performance and adjusts the skill level as needed. Now the cool kids and the smart kids are one and the same!
	Nitro Vision by VTech	Hardware/Software System	6 to 9 years	Nitro Vision comes with four learning cartridges (Math Explorer, Language Launcher, Science & Nature Discovery and Spanish) — all bursting with real-life images and colorful animations that teach lessons in reading comprehension, literature, foreign language, math, geography, science, history and more! In addition, the main menu gives your grade-schooler practice in writing notes, typing and even checking her progress using a built-in performance tracker! Simply plug the console into your TV and your child can answer questions with a wireless keyboard that's included. It's designed to teach more than 80 different skills!
	FLY Fusion Pentop Computer by LeapFrog	Hardware/Software System	8 years and up	With the FLY Fusion Pentop Computer, everything you write on FLY Paper is automatically scanned and digitized. You can then upload it to your computer and convert to text. With the tap of your FLY Fusion Pentop Computer, you can interact with your notes, get instant feedback and step-by-step help, even play MP3s and games, all on paper! And when you're ready for new software, simply download custom homework applications directly to your FLY Fusion Pentop Computer. Choose from a complete library of homework tools such as Algebra, French Translator Pro, Spanish Translator Pro, FastComp Math Pro, Writing and more to help you master your homework and make time FLY.

*Target age group as listed by company. **Descriptions copied directly from Web sites.

video games

Over the past 30 years, video games have become a prominent part of our society, and the video game industry has become a significant \$12.5 billion business (NPD, 2007). Though the stereotypical ‘gamer’ may be a 20-year-old male, June’s *New York Times* story entitled “Next in Child Prodigies — the Gamer” profiles a 9-year-old Long Island boy who has won thousands of dollars in prize money through his video game skills. Even younger children have been noted to be avid gamers. The top 20 kids game titles alone resulted in over \$500 million in revenue in 2006. Children ages 8 to 10 spend a daily average of 42 minutes playing console games and 23 minutes playing handheld games, resulting in over an hour spent playing video games every day (Rideout et al., 2005). More than eight in ten (83%) young people have a video game console at home, and a majority (56%) has two or more. Clearly, video games are a significant part of young people’s lives.

THE EDUCATIONAL VIDEO GAMES⁵ INDUSTRY

Identifying educational video games was significantly more difficult than any of the other media categories. Popular video game retailers Toys R Us, Best Buy and Amazon were initially examined; however, none of their Web sites had a section for educational video games. As retailers have not categorized educational video games to date, the Educational Software Rating Board (ESRB)⁶ was consulted. The ESRB, which is well known for rating video game and computer software, also tags software as “edutainment.” Although the ESRB has tagged almost 300 pieces of software as edutainment, only 12 of these were identified for video game platforms. To supplement this

modest list, Common Sense Media (CSM), an independent non-profit organization that reviews media products, was consulted. All products tagged by CSM as having educational value were included in this scan.

- The scan eventually yielded 69 video game products with educational value. These games were then categorized by

CATEGORY	TOTAL (%)	TOTAL (#)
Action/Adventure	28	19
Puzzle/Trivia	19	13
Sports	16	11
Music	10	7
Preschool	6	4
Role Play	6	4
Simulation	6	4
Girl Games	4	3
Arcade Games	3	2
Curriculum	3	2
GRAND TOTAL	100	69

(Chart 4)

⁵ Video Games, in the context of this report, refer to console-based games; computer games are discussed separately.

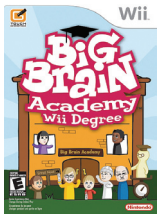
⁶ The ESRB is a non-profit, self-regulatory body established by the Entertainment Software Association.

learning content (Chart 4), which revealed surprisingly few games (only 2 games) that actually market traditional educational content (such as literacy, math and science).

- The most common categories of 'educational' video games were action/adventure and puzzle games, which were tagged as educational as they have the potential to promote logical reasoning and problem solving. For example, EA's Harry Potter and the Order of the Phoenix require children to problem solve and practice logical reasoning while they help Harry save the world from evil.

BRAIN GAMES

Though there are very few educational video games for children, 2007 has seen the mass market influx and success of trivia-style games that claim to challenge user's brains, such as Big Brain Academy Wii Degree and My Word Coach. George Harrison, Nintendo of America's senior vice president of marketing and corporate communications has said "Brain games have been a hit for Nintendo DS, so we're building on those successes for Wii and carrying the brain games series' fun and energy into the living room, where everyone can have fun together" (Nintendo, 2007).



PRODUCT EXAMPLES

Examples of educational video games are outlined in the chart below:

EXAMPLES: EDUCATIONAL VIDEO GAMES			
PRODUCT PICTURE	PRODUCT & COMPANY	TARGET AGE GROUP*	DESCRIPTION**
	Konami Kids Playground by Konami Digital Entertainment	2 to 5 years	Konami Kids Playground is a series of PlayStation2 games that turns learning into a fun, full-body activity for your preschooler. Kids, aged 2 to 5, will jump, stomp and learn their way through each of these fun and educational games.
	Word Safari: The Friendship Totems by GXB Interactive	Grades 1 and 2	Pick your favorite animal and guide them on a quest full of perilous adventures. Only your quick-thinking, reading, and vocabulary skills will lead them to safety.
	Math Patrol: The Kleptoid Threat and The Venus Virus by GXB Interactive	Grades 1 through 4	Math Patrol is an educational gaming experience offering over 70 missions of alien combat. The game automatically adjusts to the player's skill level, providing an individualized learning experience.

*Target age group as listed by company. **Descriptions copied directly from Web sites.

web destinations

Where can a child roam magical fantasy worlds, play a multitude of exciting interactive games, get help with their homework, and research anything from dentists to dinosaurs? Children can participate in these activities and many more on the Internet. With the average young person spending 48 minutes online every day (Rideout et al., 2005), the Internet has emerged as a prominent and enduring presence in the lives of most young Americans.

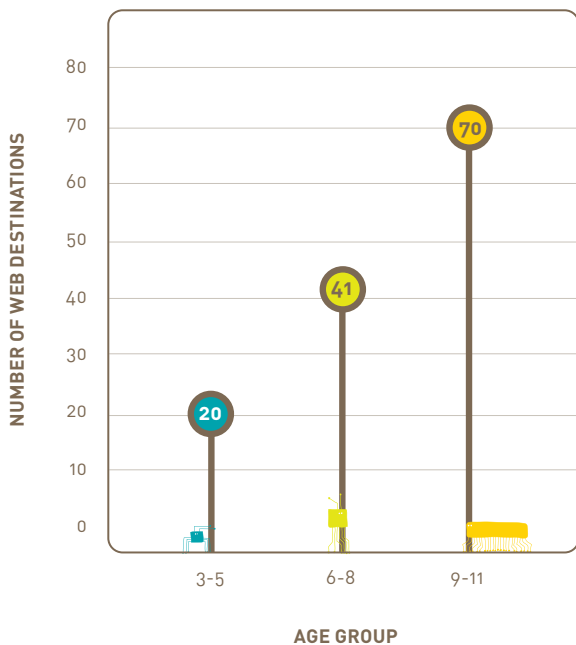
THE EDUCATIONAL WEB SITES INDUSTRY

Identifying the Web destinations that a typical child or parent would encounter if searching for an educational product differed from the other industries, as clearly there are no 'retailers' for Web destinations. Common Sense Media again helped define our standards. All Web sites tagged as 'educational' by Common Sense Media were included in the database. It should be noted that this review does not represent a

comprehensive list of every Web site targeted at children that has educational value; however, it does give an illustrative view of the state of the industry.

- This scan identified 131 Web destinations, although many more Web sites could certainly be classified as educational.
- The number of educational Web destinations increases with age (see Chart 5).
- Many of the Web sites had a strong element of commercialism, ranging from advergaming⁷ to online stores. As indicated in Chart 6, almost half (46%) of the educational Web destinations identified were tagged by Common Sense Media as having at least some element of commercialism.

number of web destinations per age group



{Chart 5}



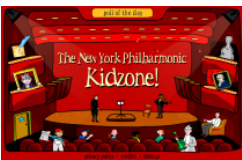


COMMERCIALISM	TOTAL (%)	TOTAL (#)
Yes	46	60
No	54	71
GRAND TOTAL	100	131

{Chart 6}

⁷ The term 'advergaming' is jargon for using video games to advertise.

PRODUCT EXAMPLES

Examples of the types of educational destinations available to children on the Internet were selected that have been recommended by Common Sense Media:

EXAMPLES: EDUCATIONAL WEB DESTINATIONS			
PRODUCT PICTURE	PRODUCT & COMPANY	TARGET AGE GROUP*	DESCRIPTION**
	PBS Kids by PBS pbskids.org/	3 years and up	Games and fun straight from 15 favorite PBS shows for kids. Play a music game with Barney, help Arthur match facial expressions with feelings, and Journey to Ernie via Sesame Street.
	Game Goo by Cognitive Concepts cogcon.com/gamegoo/ goeyhome.html	5 years and up	Lots of exciting games beckon here! Practice phonics with Frieda, the fearless surfer, or alphabetize bears so they can ride a roller coaster in Paw Park.
	New York Philharmonic KidZone! by the New York Philharmonic nyphilkids.org	8 years and up	The Instruments Lab lets you invent your own musical contraption. Too bad you can't take it home with you! This interactive site will also give you an earful of many of the different instruments the musicians play.
	America's Story by The Library of Congress americaslibrary.gov/about/ welcome.html	8 years and up	The Library of Congress offers some fun interactive games, including Super Sleuth, a song archive, and much more.
	Webmath.com powered by The Discovery Channel	8 years and up	Instant math help over the Web. It's like instant messaging a friendly math teacher!

*Target age group as listed by Common Sense Media. **Descriptions copied directly from Common Sense Media

computer software

Since its inception, computer software has been enthusiastically adopted by children of all ages for the purposes of both entertainment and education (Tarpley, 2001). In stark contrast to video games, the best selling children's educational computer software games outsold the bestselling entertainment games by over \$8 million in 2006 (NPD, 2006). And although computer software certainly brings in less hype and dollars than virtual worlds or video games, children still spend an average of 10 minutes per day playing computer games (Rideout et al., 2005). Given the widespread acceptance of computer games as an educational medium, they present an excellent opportunity for learning.

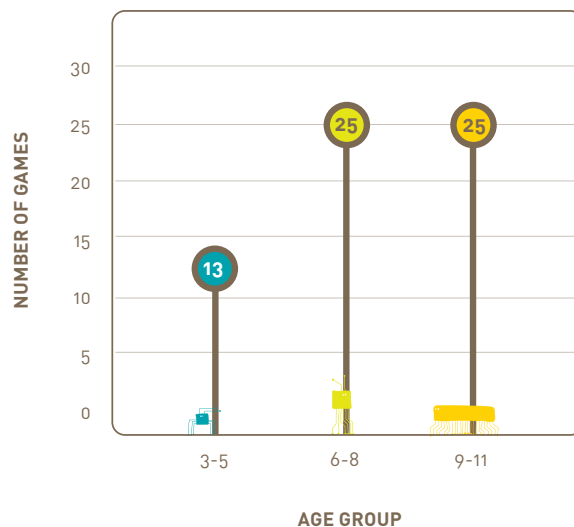
THE EDUCATIONAL COMPUTER SOFTWARE INDUSTRY

To identify what a typical child or parent would encounter if searching for educational computer software, the popular online retailer Amazon.com was examined. The Web site had a clearly identified section devoted to such software. Most children's educational computer software products are sold in branded series, each of which can have dozens of products. For example, The Learning Company's well-known Reader Rabbit software series consists of more than a dozen titles. All educational software brands listed on Amazon.com were included in this database.

- The scan found 33 children's educational computer software brands, each of which had numerous titles.

- As indicated in Chart 7, preschoolers have fewer educational software brands to choose from compared to their older peers, though what is available to them represents a significant amount.

number of educational computer software brands per age group



(Chart 7)

- Nine different companies were identified in the educational computer software space. The Learning Company has the greatest number of educational software brands; however, the top sellers are Scholastic brands (Chart 8).

COMPANY	TOTAL (%)	TOTAL (#)
The Learning Company	55	18
Knowledge Adventure	12	4
Kutoka	12	4
Scholastic	6	2
School Zone	6	2
Microsoft/Scholastic	3	1
Topics Entertainment	3	1
Vivendi Universal	3	1
Hooked on Phonics	3	1
GRAND TOTAL	100	33

(Chart 8)

PRODUCT EXAMPLES

The top selling children’s educational software titles provide examples of the type of educational software products available on the market:

EXAMPLES: EDUCATIONAL COMPUTER SOFTWARE			
PRODUCT PICTURE	PRODUCT & COMPANY	TARGET AGE GROUP*	DESCRIPTION**
	Dora the Explorer Adventure 3-Pack by Atari	3 years and up	It’s three Dora adventures together in one pack. Explore a mysterious hidden city and help find misplaced objects in the Lost City Adventure. Play games and solve puzzles with Dora and Boots on a fun-filled trip to the library in Backpack Adventure. Join Dora, Boots and Dora’s cousin Diego on an incredible journey to reunite baby animals with their mothers in Dora Animal Adventures.
	Jump Start World by Knowledge Adventure	4 to 8 years	Build fundamental skills in math, science, reading, art and more with this series of educational software. Our multiple-CD sets teach over 50 skills and have 35-plus activities through which your child can play and learn. Equipped with technology that recognizes your child’s learning style, all Jump Start games automatically adjust to your child’s pace. Also, Jump Start software grows with kids as their learning needs change.
	Brain Play by Scholastic	4 to 12 years	Supplement your child’s learning in math, science, reading, and keyboard skills with the help of some of Scholastic’s most popular characters and brands, including The Magic School Bus and Math Missions. This all-in-one software bundle includes four CD-ROMs and a workbook.
	I Spy by Scholastic	6 to 10 years	I SPY combines photographs of familiar object collections with rich rhyming riddles to create visual brain-teasing puzzles. Each time kids play I SPY, they discover clever object associations, word play, and themes which help them build important learning skills including reading, problem solving, and creativity.
	Elementary School Success by Topics Entertainment	6 to 12 years	The Success series is the zenith of self-paced instruction on CD-ROM. Unrivaled in breadth and scope of curriculum, the absorbing activities captivate user interest and maintain motivation. The Success learning system represents the very definition of educational achievement for students of all ages — from elementary school to high school.

*Target age group as listed by company. **Descriptions copied directly from company Web sites.

If anyone ever questions the ability of an educational media product to achieve mass market success, they should be reminded of a television show called *Sesame Street*. The longest-running children's program in American history, *Sesame Street* has been viewed by millions of children in over 100 countries worldwide, sold billions of dollars in licensed products, and — most importantly — become the single largest informal educator in the world. To harness digital media products for the purposes of children's education, researchers, developers and policy makers need to encourage the advancement of products grounded in pedagogy and research, drawing on the model conceived by Joan Ganz Cooney and her colleagues at the Children's Television Workshop some four decades ago.

This scan indicates real potential in today's rapidly evolving marketplace for the creation of digital media products that — like *Sesame Street* and the many excellent children's programs produced by other media developers — both educate and entertain. The following recommendations offer provocative new directions for leveraging digital media products to support children's informal learning in the areas of academic research, product development/media production and industry policy.

academic research

ROLE OF THE COONEY CENTER IN ACADEMIC RESEARCH

The Cooney Center intends to support research that promotes the use of digital media technologies to advance children's learning by:

- Connecting child development experts and educators with digital media and technology leaders.
- Creating regular dissemination mechanisms, including reports, industry briefings and virtual Web communities to translate academic research for industry application.
- Funding applied research that supports innovative applications of media trends and technologies for children's learning.

Based on the results of this scan, the Center views the following as the most pressing goals in academic research:

ESTABLISH A RESEARCH AGENDA THAT ADDRESSES THE IMPLICATIONS OF MARKET TRENDS ON PRODUCT DEVELOPMENT

This scan indicates an environment that is fundamentally different than any we have seen before; a market replete with digital media products that children can access at their will. Academic leaders need to investigate the implications of this environment on children's informal learning, and address how developers can create responsible products that attend to these implications. For example, children are spending more time immersed in digital media than ever before, they are using media at a younger age, and they are increasingly multitasking with these digital products. How should developers address these changes in the development of responsible and educational products? Trends such as virtual worlds, casual gaming, youth generated content, video content on the Web and media convergence enable children to access, control and create content in ways that were never before possible. How *specifically* should developers capitalize on this in the development of effective informal learning products?

Action step: Academic researchers need to investigate the implications of the current environment on children's informal learning, and recognize "what works" in educating children through digital media products.

DISSEMINATE ACADEMIC RESEARCH TO INDUSTRY

Independent research conducted by academic scholars in the field of educational technology typically gets published in journals read by other scholars. Rarely does this research reach the people working on products destined for the shelves of Wal-Mart. As Linda Simensky of PBS Kids articulated, "University centers do all this research and then they file it away. No one sees it or is able to think about how to apply findings. Someone who knows how to talk to industry will get a lot of feedback. That's a missing link. Facilitate exchange of information to people who need it or can use it." If research findings are disseminated to non-academics through industry publications such as *KidScreen* magazine and at annual trade shows such as Toy Fair and E3, the research will have a much stronger effect on the products that actually end up in the hands of children.

Action step: Academic institutions should disseminate research findings to industry through industry publications and events.

product development/ media production

ROLE OF THE COONEY CENTER IN PRODUCT DEVELOPMENT/PRODUCTION

The Cooney Center intends to challenge industry to create innovative, entertaining and effective educational products by:

- Commissioning media companies (commercial and not-for-profit) and independent producers to build pilot programs that are based on academic research.
- Collaborating with industry on exploring innovative uses of existing technologies for educational purposes.
- Inspiring the creation of educationally effective products through incentive programs such as design competitions.
- Rewarding the creation of educationally effective products through recognition programs such as annual prizes.

Based on the results of this scan, the Center views the following as timely goals in product development/media production:

MARKET TRENDS SHOULD DRIVE THE DEVELOPMENT OF EDUCATIONAL PRODUCTS

Informal learning products need to be developed and marketed that children *want* to use. As Henry Jenkins of MIT told us, educators often try to make standard lessons palatable

“Spinach doesn’t taste better if you put it on top of ice cream; it just tastes grosser.”

by turning them into games. “It’s like a spinach sundae,” he said, “Spinach doesn’t taste better if you put it on top of ice cream; it just tastes grosser.” To create learning products that are relevant to today’s media savvy kids, product developers should look to current market trends as inspiration for both the bottom line and an exciting new learning mission that parents and children are now seeking. Two key opportunities in the current environment identified by this scan are outlined below:

Educational video games represent a huge gap in the market. Although casual gaming has grown among younger children, this scan finds that there are very few educational video games on the market. Given that the top 20 children’s game titles brought in over \$500 million in 2006, there is ample incentive for industry leaders to develop games with educational value.

Action step: The video game industry should create educational video games for

children that are grounded in pedagogy and research.

Educational toys should capitalize on the virtual world Web/toy hybrid (i.e., Webkinz) phenomenon. Although almost half of the ELA products identified through this scan utilize an additional medium (such as television), only one product was identified that hooks users into the Web.

Action step: ELA producers should capitalize on the “virtual world phenomenon,” creating Web/toy hybrids that promote learning across platforms.

BREAK THE TRADITIONAL MODEL OF ONE CHILD ALONE IN FRONT OF ONE SCREEN

The bulk of digital media products currently on the market follow the model of one child per screen. However, educators often point out that the best learning takes place when an adult is present to scaffold the child’s learning experience. As David Dockterman, Chief Academic Officer of Scholastic’s Tom Snyder Productions and Professor at the Harvard Graduate School of Education, told us: “We don’t want kids to be locked into a screen relationship. How can media help encourage kids to have conversations with each other and adults?” Now is the perfect time to break this traditional model.

Many observers have attributed the commercial success of Nintendo’s Wii to the fact that it encourages group play. Product

developers should view the mainstream success of this product as a leading indication that the market needs and wants intergenerational media products that encourage adult-child interaction. If designed well, such products could provide a critical missing element in the informal learning market. Mitchel Resnick of MIT told us: “Kids can do amazing things with technology. They can explore and experiment in more sophisticated ways than adults would expect. But it is also true that kids left on their own will run into barriers. Many adults think they need to just get out of the way. They are wrong. Kids can browse and click and find comic book sites, but they can’t make interactive animated books on their own. So there is a big role for scaffolding if kids are to make full use of technology and really learn how to express themselves.” Intergenerational games may provide an exciting bridge between what social commentators have referred to as “me media” to the current interest in “we” experiences.

Action step: Product developers should develop informal learning toys, video games, Web destinations and computer software that encourage human interaction.

LEVERAGE POPULAR ENTERTAINMENT-BASED DIGITAL MEDIA PRODUCTS FOR CHILDREN’S LEARNING

Many researchers and children’s media experts consulted in developing this report

stated that existing products developed solely for entertainment may, if used properly, have some significant educational value. As Henry Jenkins of MIT articulated in his interview, “Pokemon cards are more challenging than many fourth-grade textbooks, though no one is taking this seriously.” In a market that is saturated with entertaining products for children, these products can be leveraged for children’s learning. Many educational children’s television shows offer supplemental materials that help parents and teachers extend learning. These materials can be as simple as activities and resources listed on the show’s Web site or as complex as nationwide after-school programs that leverage the show’s content. For example, all of the PBS.org sites include content designed for parents and teachers, providing adults with tips, tools and questions to help extend children’s learning on the site. Analogous materials could be developed for popular entertainment-based new media products, such as Webkinz or Club Penguin. One may argue that these materials are even more important for new media products than for television, as many educators and parents are less comfortable using the new media than their young children.

Action step: Companies that produce children’s entertainment-based media products should consider developing supplemental educational materials that guide parents and educators on how best to leverage such products for children’s learning.

industry policy

ROLE OF THE COONEY CENTER IN INDUSTRY POLICY

The Cooney Center advocates for effective policy reform that promotes educationally effective digital media products by:

- Convening federal regulatory bodies, voluntary industry groups and parent advocacy organizations.
- Developing policy agendas to stimulate investment in promising and proven digital media technologies for children.
- Disseminating critical findings to inform the national debate, stimulating private and public investment in effective models and reforms.

Based on the results of this scan, the Center views the following as the most urgent goals in industry policy:

CREATE EVIDENTIARY STANDARDS FOR “EDUCATIONAL” PRODUCTS

In a 2005 study entitled “A Teacher in the Living Room?” The Kaiser Family Foundation predicted that the market for children’s educational media products would continue to grow and that “educational benefits will continue to be a central theme in the marketing of those products.” Two years later this scan validates their hypothesis, finding a market dominated by products that advertise unsubstantiated educational claims. This Kaiser Family Foundation Study also recommended that clear standards be

Without firm and independently verified standards of educational value, how is a typical parent or educator able to discern if the multitude of products in the marketplace live up to their claims?

created for products marketed as educational. No such standard currently exists. Though some companies such as LeapFrog, Hooked On Phonics and Knowledge Adventure do devote sections of their Web sites to describing research and impact studies, such research is not widely available or documented. It is due

time to implement standards around marketing products with educational benefits. Without firm and independently verified standards of educational value, how is a typical parent or educator able to discern if the multitude of products in the marketplace live up to their claims?

Action step: Federal regulatory bodies such as the Federal Trade Commission, voluntary industry groups such as The Better Business Bureau, and parent advocates such as Common Sense Media should collaborate on a consumer protection initiative to better describe educational effectiveness in interactive media products for children.

IMPLEMENT POLICIES TO PROTECT CHILDREN FROM COMMERCIALISM IN A DIGITAL AGE

In 1971, almost half of Romper Room content was devoted to commercial promotion of its own products (Earle, 1971). Since then, substantial research has investigated children’s understanding of TV advertisements, and policies such as The Children’s Television Act have been put in place to protect children from overzealous advertisers. An analogous process needs to be undertaken for new media. And it needs to happen quickly. The emergence of virtual worlds for children provides an unprecedented opportunity for

marketing. Research firm Parks Associates estimates that advertisers will spend \$150 million in virtual worlds by 2012 — 10 times the amount spent in 2006 and excluding what marketers are investing in their own virtual worlds such as Be-Bratz! (be-bratz.com). At a recent conference on virtual worlds, Jason Root, vice president of digital for Nick.com made the following statement about the virtual world Nicktropolis (nicktropolis.com): “We’ve had no advertising since we launched, (but we’re) on the cusp of interesting advertising developments, and we’re evolving with that. We’re going to have a great immersive experience both with kids and advertisers” (Olsen, 2007). To create a future in which digital media products further children’s education rather than their consumerism, we need to implement policies that protect children from commercialism in a digital age.

Action step: Federal regulatory bodies, such as the Federal Communications Commission, and voluntary industry, public interest advocacy, and philanthropic organizations, should initiate the advancement of policies that protect children from commercialism in a digital age. A revitalization of The Children’s Television Act needs to be undertaken to modernize the child protections now called for in a digital age.

In 1966, a former public affairs television producer named Joan Ganz Cooney asked the fundamental question: “How can emerging media help children learn?” At the time, the term ‘emerging media’ referred to open circuit television. The answer was an educational children’s television show called *Sesame Street*; a program that helped change the face of children’s television as we know it today. Forty years later, the term ‘emerging media’ refers to digital media products that range from multi user virtual environments to augmented realities. However, though the media is drastically different, the question has not been fundamentally changed. It is our hope that this scan and analysis of the children’s interactive media environment will serve as a tool for researchers, producers and policy makers who are attempting to answer Mrs. Cooney’s original question. Perhaps one day soon the modern day equivalent of “*Sesame Street*” will emerge. Until then, we hope to begin a new revolution in harnessing the unprecedented power and ubiquity of digital media to educate and delight children worldwide.

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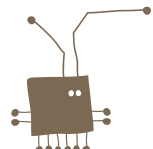
ABOUT THE AUTHOR

Carly Shuler recently graduated from the Harvard Graduate School of Education with an Ed.M. in Technology, Innovation and Education, where she studied how new media and emerging technologies can be used to effectively educate children. While at Harvard, she contributed to a number of children's educational television shows, working as a research associate for the early literacy program *Between the Lions* and completing a graduate internship for *Postcards from Buster*. Prior to her graduate studies, Carly worked in the toy industry at Spin Master Ltd., where she managed product development and marketing for a number of educational preschool brands, including Aquadoodle, an award-winning toy that encourages creativity, and Word World, a licensed line based on the animated children's series that seeks to increase literacy. Ms. Shuler can be contacted at carlyshuler@post.harvard.edu.

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the Joan Ganz Cooney Center
at Sesame Workshop

One Lincoln Plaza
New York, NY 10023
p: (212) 595-3456 f: (212) 875-6088
cooney.center@sesameworkshop.org
www.joanganzcooneycenter.org

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