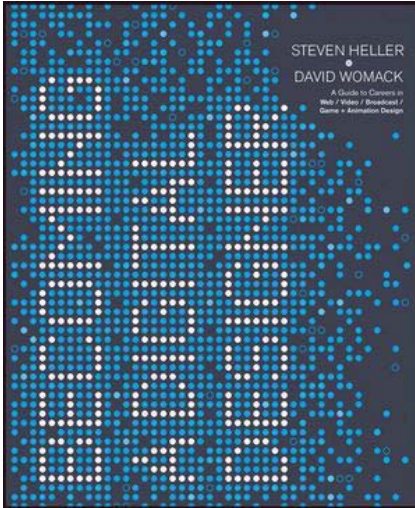


Becoming a Digital Designer



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**Becoming a Digital Designer:
A Guide to Careers in Web,
Video, Broadcast, Game and
Animation Design**

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The following text is the pre-edited version of an interview of Hugh Dubberly by Steven Heller. The interview was performed via email in April of 2006, and was later published in book form in 2007.

You were a true pioneer in the digital world, when we just called it “computers,” what made you jump into the breach so early?

When I was an undergraduate at RISD, Chuck Bigelow introduced me to digital type design. Dutch type designer Gerard Unger was also teaching at RISD. They encouraged students to focus on low resolution type. For me, that led to a summer job with Xerox working on type for some of the first laser printers. Chuck also introduced me to Don Knuth’s work on Metafont, a programming language for describing typefaces. As a grad student at Yale, I designed a typeface using Metafont. Several of my classmates from RISD also got involved in font design. Carol Twombly, Dan Mills, and Cleo Huggins went to work at Adobe shortly after it was founded. They’ve been able to retire. I took another path. I went to Wang Laboratories to be design director. (This was when Wang was a Fortune 500 company and one of the largest computer manufacturers.) My work at Wang led to Apple. Apple led to Netscape. Netscape led to my own design firm, specializing in software design.

Apple was an amazing place. I got to grow up with the technology. My first week, I got to play with a video camera connected to a MacPlus. It scanned on the fly, one column of pixels at a time. You had to hold very still to get a traditional portrait. Of course, everyone moved which created fantastic experiments.

At Apple, two moments stand out for me. The first was seeing John Warnock demo the software that became Illustrator. He lugged in a MacPlus, booted it up, clicked, drew out a line, clicked again, and there was a curve which he proceeded to adjust. It was an epiphany for me. I’d programmed in Metafont and Postscript, where control of curves had been indirect. But I had enough experience to realize Warnock was showing an application that

wrote Postscript as you drew. My second epiphany was seeing Bill Atkinson demo the software that became HyperCard. I was working in a conference room with a writer. Bill walked in and said, “Oh. This isn’t my meeting.” My writer friend recognized Atkinson and was smart enough to ask Bill what he had on the hard disk he was carrying. Bill’s eyes lit up, and he showed us a slideshow—images flying by faster than anything we’d seen on a Mac or PC at that point. Then he stopped on a slide of a carriage. He clicked on a wheel and brought up a slide of car; he continued clicking on a series of visual links. The only place I’d ever seen anything like it was on a DARPA project at MIT. It was amazing. Bill’s demo led to my involvement in launching HyperCard and to making HyperCard applications for Apple such as the HyperCard version of Apple’s 1987 Annual Report. My work on HyperCard led to working for Apple on “Knowledge Navigator” and a series of other videos on the future of computing. From there, it was a short step to working on multimedia and the web which brought me and several other Apple folks to Netscape where we designed and built large-scale web-based services.

Do you believe, as many have predicted, that the digital realm will surpass traditional print production and design?

Yes. It already has.

Last week, I taught a seminar at University of the Arts in Philadelphia. On the sixth floor, between two computer labs, they still have a giant process camera. It’s so big you walk into the back of the camera to load the film. I saw no one use it the whole time I was there. Process cameras used to be everywhere. When I was a student, they were in constant use, and you had to put your name on a waiting list to get a turn.

Twenty years ago we labored through a complex analog process to produce a piece of print. Sending out for type, pasting it up, shooting the paste-ups to make film, stripping the film into flats, making plates from the flats. Today, everything including making the plate is digital. For now, high-end color printing remains an analog craft, but even that is changing. The quality of high-speed digital printing continues to improve even while costs fall. What’s more, every copy can be customized so it’s a little different from the next.

Design of printed communications has moved from mass production to mass personalization. We used to think in terms of grid systems. Now we have to think in terms of creating and managing information assets—in terms of databases and content management systems.

Are there design conventions for digital work that are substantially different than for print?

Printed information can still be a little bigger and a lot higher in resolution than information you see on screen. With print, it's possible to show everything at once as on a poster; that's still almost impossible on screen. (But eventually that will change, too.)

Computers and networks have enabled us to look more closely at how we interact with information and at the role of time in presenting information. Of course, sequence has always made a difference in design. Books and architecture have always been interactive. And opera has long been “multi-modal” or “multi-media.” But somehow in the last ten years or so our focus has changed. It's now possible to work as a communications designer without preparing pieces for mass-production printing. It's possible to focus solely on designing for the screen. New design activities have emerged around structuring information (information architecture), around sequencing activities (interaction design), and around creating worlds in which people can play (game design).

The earliest work in this area is only 40 years old, and only within the last 10 years have large numbers of people been focused on designing in the new media. It's all pretty new. We're still inventing new forms, new language, new conventions.

Pioneers like DW Griffith or Sergei Eisenstein adapted film technology to telling stories. We're still waiting for someone to invent the new media equivalent of Porter's “The Great Train Robbery” and Eisenstein's “montage.”

What are some of the ways in which the digital has evolved since you began?

Gordon Moore's law, the fact that processor speed doubles every 18 to 24 months (at the same price), drives the information revolution. A similar law applies to network bandwidth—wired and

wireless. Networks introduce another “effect.” Robert Metcalf’s law points out that networks become exponentially more valuable as they grow—every new member can connect to every existing member. These basic processes have led to profound change.

Computers used to be rare and expensive.

They’re becoming cheap and ubiquitous.

Negroponte will soon deliver a notebook computer for less than \$100.

Google has the world’s largest civilian computer with 150,000 CPUs.

And Google is still growing. Quickly.

Computers have moved from tool to medium.

From stand-alone to networked.

When I was a grad student,

I had to go to the computer center to work.

Now you’re “always on,” always connected.

Pagers, mobile phones, Palm, Blackberry, and digital cameras happened.

ATMs and TiVo happened.

Multimedia, hypertext, and the internet happened.

Netscape, Amazon, eBay, Yahoo, and Google.

Newsgroups, chat rooms, IMs, cams, blogs, RSS feeds, tags.

Web 2.0

We’re soaking in cyberspace.

The science fiction of Vernor Vinge, William Gibson, and Neal Stephenson has become real life.

We have become our avatars, working, playing, and living in virtual worlds.

Making a living as a trader on eBay no longer surprises us.

Now we’re seeing people make a living playing Everquest or in virtual places like CyWorld and Second Life.

Of course, when I started working, the world was black and green. No grays. No color. Black and white was a step up. We worked on a 512 x 342 pixel, 9-inch screen and ran the whole OS, application, and data file in 1MB of RAM on an 8 MHz processor. For a long time we swapped floppy disks to manage applications and data. Jumping to a 20 MB hard disk was a big deal.

Things have changed. Today for about the same price you can get a screen that’s 2560 x 1600 pixels (30 inches) and a computer

running a 2+ GHz processor with 1 GB of RAM and a 120 GB hard disk. (Your processor probably has more RAM in its internal cache than my first Mac had in total.)

In the 20 years since I joined Apple, screens are almost 25 times larger, processors 2,000 times as fast, RAM at least 1,000 times as large, hard disks more than 6,000 times as big.

Where will we be in another 20 years?

What are the ways digital designers will be used in the next few years as new devices and better programs are developed?

Some opportunities for designers are easy to see: More games. More web sites. More web-based applications. A proliferation of hand-held devices.

Less obvious is the need for designers to help make sense of changing technology: The long-promised digital convergence has arrived. Your phone is a camera, a radio and music player, a game device, a PDA, and a computer. Soon your TVs will be connected to each other, to your stereo, to your game machines, and to the internet. Computing is becoming “ubiquitous:” Anywhere. Anytime. Wireless will keep us connected. GPS and RFID will identify the location of everything. The distinction between virtual and physical will fade.

These changes create the opportunity for many new kinds of products. Companies will experiment with different combinations of technologies, services, and business models. They will tinker with variations on organization and interface. They will try new things. They will experiment—and all of these experiments will require design and designers.

At the same time, the practice of design is changing. Design has moved from a focus on form and meaning to a focus on action and interaction. Increasingly, designers are faced with the need to design integrated systems. Systems of systems. Connected sets of products and services. These systems form ecologies that grow and evolve. Their outcome cannot be pre-determined. Even the full range of use may be difficult to predict.

The challenge for designers becomes creating expandable platforms. Creating tools for creating tools. Designing for customiza-

tion. Designing for conversation. Designing for evolution.

Among the biggest challenges for designers will be identity, privacy, and community.

- *How should people be able to represent themselves online?*
- *How do we preserve anonymity while also maintaining community?*
- *How should progressive disclosure and reciprocating disclosure work?*
- *How do we encourage diversity without losing a shared center?*

What would you say is the most ground-breaking program(s) created in the past ten years?

Why limit the list to ten years?

1968 Fall Joint Computer Conference Demo

Douglas Englebart
The mother of all demos.

1969 ArpaNet

The father of the internet.

1971 Unix, Bell Labs

Current versions still run banks, corporations, and our military.

1973 Xerox Alto workstation, PARC

Chuck Thacker
Alto begat Star. Star begat Lisa.
Lisa begat Mac. Mac begat Windows.

1979 Ethernet

Robert Metcalfe
The foundation of networking.

1979 VisiCalc

Dan Bricklin and Bob Frankston
The first spreadsheet – modeling with numbers.

- 1985 PostScript**
John Warnock and Chuck Geschke
The foundation of printing.
- 1985 PageMaker**
Paul Brainerd
The beginning of the end of typesetting.
- 1987 Illustrator**
John Warnock
The beginning of the end of plaka.
- 1987 HyperCard**
Bill Atkinson
Hypertext for regular people.
- 1990 Photoshop**
Thomas Knoll and John Knoll
Now every kid with a computer runs a Scitex machine.
- 1991 Linux**
Linus Torvalds
Proof that open source works.
- 1994 Mosaic (later Netscape)**
Marc Andreessen et al.
Adding images to web pages changed everything.
- 1994 Amazon**
Jeff Bezos
Allowing commerce on the internet
changed everything again.
- 1995 Auctionweb (later eBay)**
Pierre Omidyar
Universal markets emerge;
the net develops its own currency.
- 1998 Google**
Larry Page and Sergey Brin
A good search engine,
an amazing networked operating system.

- 1999 Craigslist**
Craig Newmark
The beginning of the end of classified ads and yellow pages.
- 1999 Napster**
Shawn Fanning
A testimony to the power of distributed networks.
- 1999 Salesforce.com**
Parker Harris
Proof businesses will lease web-based services.
- 2001 Wikipedia**
Jimmy Wales
Proof that collaborative media works.
- 2001 iPod, iTunes, and the Apple Music Store**
Steve Jobs
The quintessential integrated system of products and services.
- 2003 MySpace**
Tom Anderson and Chris DeWolfe
The most successful social networking service.
- 2004 Flickr**
Stewart Butterfield and Caterina Fake
25 million users tag photos—more collaborative media.

What skills should the new media and digital designer learn to be literate in this field?

The main thing for designers is to be curious—and to learn how to learn. My ideal curriculum might look something like this.

Design Theory:

- Design Methods
- Research Methods
- Information Structures and Key Models
- Principles of Interaction
- Philosophy and Ethics of Design

Visual Studies:

- Principles of Visual Perception
- Rapid Visualization Drawing
- Typography (editorial and display)
- Content Management Systems (grid systems)
- Way-finding Systems
- Information Design (visualizing information structures)
- Motion Graphics
- Sound Applied to Motion Graphics
- Film Making

Design Practice:

- Information Spaces
- Tools and Applications
- Games and Collaborative Authoring Environments
- Interactive Spaces
- Controls and Haptic Interfaces (physical interfaces)
- Integrated Systems of Products and Services
- Tools for Making Tools
- Systems that Evolve

History:

- of Art
- of Architecture
- of Graphic Design and Product Design
- of the Design Methods Movement
- of Science and Science Fiction
- of Information, Computing, and Interaction

Computer Science:

- Procedural Programming
- Data Structures
- Object-oriented Programming
- Web and Network Applications
- Building Sensors, Displays, and Actuators
- Modeling with Fractals, Genetic Algorithms, and Cellular Automata

Communications:

- Writing
- Public Speaking
- Rhetoric
- Semiotics
- Epistemology
- Cybernetics (science of feedback)

Related Disciplines:

- Biology (natural systems)
- Cognitive Psychology (learning systems)
- Sociology (social systems)
- Cultural Anthropology and Ethnography
- Marketing
- Economics
- Organizational Management

What was your most challenging project and why?

We are helping Nikon redesign all the software that ships with their cameras. It is a very collaborative process that involves designers, engineers, and marketing people in Japan, the United States, and Europe. They are very smart, very good people. In many ways, they are an ideal client. Yet, working across many disciplines, many cultures, and many time zones makes the process complex and takes time. As our relationship has progressed and we've learned more about how they work and how they manage, we've begun to talk about the design not only of products but also the design of the development process and how development is managed.

This process is far from unique. Sustained software design engagements naturally lead to discussions about organizational issues. Whether for large manufacturers or small start-ups or web-based services companies, making substantive changes in products—real improvements—sometimes requires changing the way organizations work, changing the process by which products are developed. This type of organizational change can take a lot of time. Often it requires multiple product cycles. Facilitating organizational change is a new and challenging role for designers.

Do you have a philosophy or methodology about design in the digital environment?

I believe design should make the world better. It should serve people. It should make things stronger, faster, clearer—and cheaper. It should surprise. It should engage. It should delight.

I believe design is a collaborative process. In that sense, design is political. It is a sort of discussion. And the designer's role is to help facilitate the discussion. The traditional tools of drawing and prototyping are remarkably helpful in this role. Sometimes the subject of

the discussion is abstract. In such times, designers must be able to prototype abstractions—they must be able to create models, which are simply tools for thinking.

I believe designers should root their work in the context of its use. We must understand our audience. Who are they? What do they believe? What do they want? At the same time, we must understand the economic systems and technologies which make products possible. All three equations—audience, business, and technology—must be solved simultaneously.

What do you look for when hiring young designers (or technicians)?

I try to hire people who are better at something than I am. I look for people who are curious. People who read. People who try new things. People who are excited about technology. And design.