Five Principles of New Media: Or, Playing Lev Manovich
by Madeleine Sorapure

Introduction

In *The Language of New Media*, Lev Manovich proposes five "principles of new media"—to be understood "not as absolute laws but rather as general tendencies of a culture undergoing computerization." The five principles are numerical representation, modularity, automation, variability, and transcoding. I focus on Manovich's work because I believe it effectively examines the materiality of new media—that is, the influence of the computer's interface and operations, its logic and ontology, on the production, distribution, and reception of new media.

This article offers an interactive explanation and demonstration of the five principles of new media, particularly as they apply to teaching writing, and drawing on work done by students in my Winter 2003 "Writing in New Media" course. Students in the course worked on three projects—two in Photoshop, one in Flash—and they wrote three project reports in which they commented on their own work as well as on theories of new media that we were reading and discussing in class. Text and images are included here with the students' permission, along with links to some of the Flash projects they composed.

The menu to the left allows you to navigate through the article. On all of the screens, you can rollover and/or click on buttons and images to make things happen and to make text visible. Directions at the top of each screen should help you determine how to proceed.

1. Numerical representation

Because all new media objects are composed of digital code, they are essentially numerical representations. That is, all new media objects can be described mathematically and can be manipulated via algorithms. According to Manovich, the key difference between old and new media is that new media is programmable. The closest we can get to the 'materiality' of a new media object is to talk about the numbers and formulas that constitute it. In new media compositions, the opposition between visual and verbal is bridged in the sense that both are code—both image and text are programmed and programmable.

The image above attempts to draw attention to the numbers and code operating behind the scenes, as it were. The mouse's x and y coordinates are displayed along with the code used to achieve this effect.

2. Modularity

Pixels, images, text, sounds, frames, code—independent elements like these combine to form a new media object. These elements can be independently modified and reused in other works. The modularity of new media is related to the modular character of structural computer programming, such as we find in Java and C++, in which independent functions or subroutines are brought together in larger programs. In Photoshop, modularity is most evident in layers; a single image can be composed of many layers, each of which can be treated as an entirely independent and separate entity. In Flash, modularity is evident in frames, layers, scenes, and symbols, each of which has a certain independence and yet is an integral part of the Flash movie. The entire Web, Manovich notes, has a modular structure, composed of independent sites and pages, and each webpage itself is composed of elements and code that can be independently modified.

In the image above, independent pieces of the keyboard image can be combined to reconstitute the image—or to make some other keyboard-ish image. Click on the "examples" link to the right to view student work that incorporates modularity.

Modularity: examples

Though a typical essay has, in some sense, a modular structure—with sections, paragraphs, sentences, and words that have a certain amount of independence and can be modified separately—one of the aims of writing an essay is precisely to reduce their independence, to tie these elements together in a sequential, logical manner. So in working with the modularity of new media, students in my course were compelled to adopt strategies that were likely unfamiliar to them.

The first two examples—"Well Oiled Machine" and "Manufacturing Consent"—come from a Photoshop collage assignment in which students combined two or more images to convey a message. The third example—"Sail On Silver Girl"—comes from the Flash assignment, which asked students to create an animated and/or interactive interpretation of a text.

- "Well Oiled Machine" by Ryan Warmke
  Ryan's image provides a good example of the principle of modularity in the sense that the three images here—the hands, the hundred dollar bill, the skyscrapers in the background—are distinct components. I didn't ask my students to do this, but it would be an interesting assignment to have them take one layer from an image and put it in a different context. The ability to reuse and recombine elements of a new media object—a collage, a Flash movie, a webpage—is what makes modularity interesting. The logic of collage and of some other forms of new media is spatial rather than linear, as layers exist conceptually on top of or beneath each other; and, as in hypertext compositions, meaning emerges through association and juxtaposition.

- "Manufacturing Consent" by Taro Ando
  In making collages, students had to work with Photoshop's layers in order to create meaning through the juxtaposition of different images. In Taro's image, each component is on a separate layer. There are probably about 18 layers in this image. Taro comments that "I had all the different images as separate layers and thus, I could make infinite amounts of alterations." In an illustration of remediation, Taro's image comments on a documentary about Noam Chomsky's book (*Manufacturing Consent*) in which, Taro explains, "Chomsky theorized that news media was being used to manipulate the public's opinions towards the outlook of those in power."

- "Sail On, Silver Girl" by Kristen Miglore
  Illustrating a "remix" approach, Kristen's Flash movie was inspired by Johnny Cash and Fiona Apple's cover of Simon & Garfunkel's famous "Bridge Over Troubled Water," a reinterpretation that Kristen then reinterpreted and remixed by illustrating it with Surrealist-inspired images. Kristen wrote that "I definitely didn't want to create a literal visual translation of the song." Rather, she wanted to use "powerful symbolic images in a piece to trigger different reactions in each individual viewer." (Note: click on the image above to launch the movie in a new window.) Although it's something of an inside joke, Kristen also used this project to remix some of her earlier work in the class: the dancing girls that appear at the end of the movie were a component that Kristen had rejected for her collage project; the leaning Tower of Pisa toward the end of the movie is one piece of the collage that Kristen ultimately composed.

3. Automation

Automation is seen in computer programs that allow users to create or modify media objects using templates or algorithms. Because of powerful automated functions built in to the software, Manovich

notes, “human intentionality can be removed from the creative process, at least in part” (32). As Manovich puts it, “The creative energy of the author goes into the selection and sequencing of elements rather than into original design” (130). Authorship or artistry involves selection from pre-existing images, code, or other elements and a kind of "collaboration" with the software to see what is possible. Automation is evident in the filters, special effects, and other operations in Photoshop that allow users to modify images. In Flash, automated tweening allows users to specify the beginning and end of an animation, and Flash automatically draws all of the frames in between. The interactive image above, particularly the brief movie clips that play when you "focus" the camera, shows some examples of automated effects achieved in Photoshop and Flash. Click on the “examples” link to the right to see student work that incorporates automation.

Examples

The automated character of new media composition was the feature that most intrigued and disturbed my students. Automation raised for students questions of originality, creativity, and authorship—that is, they were compelled to examine how their interactions with the computer influenced the work they were able to produce. Students probably have had some experience of automation in MS Word: with templates that automate document design and formatting, or the spell checker and grammar checker that automate corrections. But the automated functions in Photoshop and Flash are of a different magnitude.

The first two examples—“Ruin” and “Spin”—come from a Photoshop assignment in which students created a visual representation of a four-letter word. The third example—“Apprehensions”—comes from the Flash assignment.

- “Ruin” by Sonia Fernandez
  Sonia writes that she tried to convey "the several meanings of 'ruin' both as noun and verb, as a state of decay as well as the remains of something that has been destroyed." One of the most interesting features of this image is the shadow layer, which Sonia describes as "an experiment in depth but also an attempt to depict the human habit of filling in the gaps. We see something incomplete and we try to reconstruct it in our minds." The fact that Sonia didn't draw this shadow herself but rather called on Photoshop to create it, change its opacity, and distort its perspective demonstrates the operation of automation in this image.

- “Spin” by Michelle Balter
  Photoshop offers a wide array of filters, effects, layer styles, and actions--all of which automate the process of creation and, to some extent, compel students to think about their collaboration with the software program. Michelle, for instance, writes, "I tried effects over and over and in different forms depending on what I thought the name of the effect would create. If I had known every effect the program could create, perhaps the image would have looked entirely different—for better or worse.” In general, students were more familiar and more comfortable (as are we all) with the notion of the author as solitary genius who is solely responsible for the work’s unique content, and so they struggled with the idea of authorship as collaboration with a software program and selection from pre-existing code, filters, and images.

- “Apprehensions” by Simone Polgar
  Describing her collaboration with Flash, Simone writes, “I had such a difficult time trying to get the desired results with Flash in the beginning that I began experimenting with simple tools such as the fades, digital paintbrush, and digital eraser. The more I experimented the more I was able to set aesthetic goals as I became more familiar with these tools.” Simone's project combines digitized versions of images drawn by Djuna Barnes with quotations from *Nightwood* and an audio track by Gridlock. (Note: click on the image to launch the movie in a new window.) In one sense, Simone's project is nothing more than a "tissue of quotations," to cite Barthes' "Death of

the Author." And yet it is also quite clearly a unique and creative interpretation of Djuna Barnes' work.

4. Variability

Manovich writes, “a new media object is not something fixed once and for all, but something that can exist in different, potentially infinite versions” (36). Unlike old media, new media does not “hardwire” structure and content together. One example of variability is found in hypertextual or interactive media that allow users to take different paths through a text and therefore access different content. Manovich connects the variability of new media to the logic of postindustrial society, which values individuality over conformity. “New media objects assure users that their choices—and therefore, their underlying thoughts and desires—are unique, rather than preprogrammed and shared with others” (42).

An important case of the variability principle involves databases from which “a variety of end-user objects . . . can be generated, either beforehand or on demand” (37), as in Web pages generated on the fly and customized to user preferences. The variability in the example above comes from code that generates rectangles of random size, placement, and opacity each time you press a button, as well as from the interactive features that allow you to select and deselect colors and backgrounds and erase existing squares. Each variation will be unique.

Examples

Working on the projects in the course, students experienced the principle of variability in the sense that, with just a few mouse clicks or selections from menus, they could generate many different versions of their images and movies. Indeed, one of the questions I asked students to consider in their project reports was “how did you know when you were done?”

With the Flash project, some students took on the challenge of trying to create a variable experience for their readers by including interactive elements in their work. Animations in Flash are (relatively) simple, but interactivity involves scripting and code. For instance, to create a button that a reader can use to navigate from one scene to the next, or to create a rollover effect, it’s necessary to do some scripting. Variability via interactivity is thus more difficult to achieve. The three examples here, all of which incorporate some interactivity and variability, come from the Flash project.

- “Palm Trees” by Tracy Banks
  We see the database model of variability in Tracy's Flash project, "Palm Trees," which is modeled after a new media work called "Dissolution" by Zahra Safavian at PoemsThatGo.com. What Tracy has done here is to take four poems about palm trees, divide each poem into segments, design seventeen different palm tree images, and combine all of this with a karaoke version of "Kokomo." Users then activate this database of words and images as they interact with the piece. Tracy comments that the meaning of her project is "contextuality" in the sense that "the same line from a particular poem can assume several different meanings based on the lines that come before and after it (which is controlled by the viewer) as well as the sound and image that appear with it.”

- “The Reality Effect” by Sonia Fernandez
  Sonia’s project is a new media version of a gallery exhibition that she collaborated on with her sister, in which photos from the Philippines and text depicting both its beauty and its poverty were juxtaposed. (Note: After you launch the project, enter the gallery, and select a pair of photographs. Moving your mouse to the dark areas above and below the pairs of photographs reveals the text.) According to Sonia, “the main thrust of this project was to depict the irony of the representations of the Third World, seen as a paradise because of its beauty and potential for

development, despite the obvious squalor and poverty that exist in those places." Sonia comments, "What was really important to me was that although there were lots of elements to the project, the amount experienced was left up to the user." Illustrating the principle of variability, choices about what text to read and in what order to view the images will affect the experience of the project.

- "today i was an evil one" by Taro Ando
  Variability often comes from interactive options offered to users, and in Taro's movie there is only minimal interaction. On most of its screens you can rollover or click on characters' faces to cause some change. Nevertheless, this minimal interactivity was the crux of the project for Taro, who wanted to make a "new media music video" for his favorite song by Bonnie 'Prince' Billy. As Taro explains, "I incorporated interactivity to my project just to make it different from old media. I thought that with something like a music video, I had to make it different from one that people could just view on MTV. That difference was in interactivity, and I made sure that most of my scenes had some form of interactivity to engage viewers."

5. Transcoding

The last and broadest of Manovich's five principles of new media, transcoding is "the most substantial consequence of the computerization of media" (45). Transcoding designates the blend of computer and culture, of "traditional ways in which human culture modeled the world and the computer's own means of representing it" (46). Technically, transcoding refers to the translation of a new media object from one format to another (for example, text to sound) or the adaptation of new media for display on different devices. Broadly, transcoding designates the ways in which media and culture are being reshaped and transformed by the logic of the computer. The computerization of culture is a process of transcoding, as "cultural categories or concepts are substituted, on the level of meaning and/or language, by new ones that derive from the computers ontology, epistemology, and pragmatics" (47).

The image above is meant to represent the intersection of the culture layer and the computer layer. It also draws attention to the effect of transcoding on self-representation—in other words, the ways in which the logic of the computer infuses how we think about and represent ourselves.

Conclusion

In my course, students produced as well as analyzed new media texts, and composing in Photoshop and Flash undoubtedly informed and enriched their understanding of new media. But writing reports for each of their projects was also crucial in helping students analyze and apply theories of new media that we had been discussing in class. Although we read other theorists of new media, students seemed most drawn to Manovich's work, largely, I think, because of its accessibility and its flexibility. In his *Kairos* review of *The Language of New Media*, Bradley Dilger argues that the text has "huge classroom potential" not only because of its clear structure and generally jargon-free writing but also because of its generative approach. Manovich's principles of new media, as I hope this article shows, generated many new insights and questions and possibilities for student writers in my course.

The principles of new media defined by Manovich are just the starting point of a book that goes on to examine new media in rich detail, particularly in terms of cinematic and visual media. Like the book as a whole, though, the five principles are grounded in the logic, concepts and operations of the computer, as Manovich merges computer science and media studies into a proposed "software studies." All definitions of new media that I know of see it as computer-based production, but Manovich takes up most thoroughly the implications of this fact, focusing on the materiality of new media by focusing on the influence of the

computer. Such an approach might serve to complement or deepen current debates in composition having to do with usability or with visual/verbal dichotomies in new media work.

This article is itself a new media composition, and the five principles described by Manovich can certainly be seen here. There are also some unique challenges involved in composing an academic article in Photoshop and Flash, in combining 3500 words of text with graphics and interactivity. Flash was not, of course, made with academic writing in mind, and so using Flash for this kind of article is working against the grain of the software, trying to exploit new possibilities, particularly with animation and with a kind of interactivity that goes beyond linking. Aside from the matter of coding and designing the article, the most difficult challenge for me has been presenting text in a way that's detailed and yet compact, with short independent units combining to form a coherent argument and with interactivity that enhances rather than distracts from the content.

Credits

Text:

Lev Manovich, *The Language of New Media* (MIT Press, 2001).

Bradley Dilger, Review of *The Language of New Media* (*Kairos*: http://english.ttu.edu/kairos/7.1/reviews/dilger/).

Student reports by Taro Ando, Michelle Balter, Tracy Banks, Sonia Fernandez, Kristen Miglore, Simone Polgar.

Audio:

The music on the opening screen is Erik Satie's "La Balancoire" [PianoMusic by Erik Satie (Yitkin Seow pianist). Hyperion, 1989].

Graphics:

All images in this article come from clip art or from photographs that I took, with the exception of the images of student work by Taro Ando, Michelle Balter, Tracy Banks, Sonia Fernandez, Kristen Miglore, Simone Polgar, Ryan Warmke.

Code:

I wrote all of the code for this project, with three exceptions. The code for the swing menu on the left side of each screen was modified from code generously sent to me by Niall Walsh (http://www.niam.co.uk/niall/). The randomly generated shapes and lines in the Variability section came from code written by Oliver Shaw and found at http://www.flashkit.com. I modified this code fairly substantially, but Shaw's code is the foundation. The running man in one of the animations on the Automation page comes from tvogel's script, also found at http://flashkit.com.

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