Chapter 6: Searching for Guinea Pig B: Case Study in Online Research

Fluency with Information Technology
Third Edition

by
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Getting Started with Online Research

- Curiosity-driven research
  - Begins with a name or word
  - Too little information to begin an informed search with a search engine
- Searching for information on R. Buckminster Fuller
  - Google search on Buckminster AND Fuller
    - Returns at least 1,010,000 hits
  - Limiting to Buckminster AND Fuller AND biography
    - Reduces hit count to 123,000 — still too many
  - Need to gather identifying information (possibly from another source) for a more effective, focused search

Narrowing the Search

- In this case, an online biography source
  - www.biography.com/search/

Fuller, R(ichard) Buckminster (1895–1983)
Inventor, designer, and futurist, born in Milton, Massachusetts, USA. The great-nephew of Margaret Fuller, he left Harvard early and largely educated himself while working at industrial jobs and serving in the U.S. Navy during World War I. One of the century's most original minds, he free-lanced his talents, solving problems of human shelter, nutrition, transportation, environmental pollution, and decreasing world resources, developing over 2000 patents in the process. He wrote some 25 books, notably Utopia or Oblivion (1969) and Operating Manual for Spaceship Earth (1969). A professor at Southern Illinois University (from 1959), he became in his later decades a popular public lecturer, promoting a global strategy of seeking to do more with less through technology. His inventions include the Dymaxion House (1927), the Dymaxion Car (1933) and, foremost, the geodesic dome (1947). He has the distinction of having both his names used for a scientific entity, the fullerene (also known as a 'bucky-ball'), a form of carbon whose molecule resembles his geodesic dome.

Figure 6.1. Biography.com's biography of Buckminster Fuller.

Expanding the View

- From Fuller's biography we learn:
  - His full name (Richard Buckminster Fuller)
  - He is great-nephew of Margaret Fuller
    - Who is she? We look her up on biography.com
  - That he invented a house and a car that he named Dymaxion
- One biography from Wikipedia lists a different number of patents, which reminds us that
  - Different sources differ in information
  - In all academic institutions, Wikipedia is unacceptable as a major source for a research paper
- New search on Buckminster AND Fuller AND biography AND Dymaxion
  - Returns 87,300 results

Searching for Images

- To find out what Fuller looked like:
  - Use Google's image search (click the Images tab)
  - Entering Buckminster Fuller returns more than 14,500 JPEG and GIF images

Figure 6.5 Three photographs of R. Buckminster Fuller.

Bookmarking Links

- For sites we might want to return to later
- For pictures, it's easier to save a copy rather than bookmark the URL
- When researching, bookmark every site visited and record all search keywords in a file, so you can reconstruct the search
- Bookmarks can always be deleted

Primary Sources

- Fuller called himself "Guinea Pig B"
- Search for Buckminster AND Fuller AND "Guinea Pig B" AND dymaxion returns 218 results
- First hit is from WNET (New York Public Television) documentary on Fuller
  - Links to essays, one by Fuller's daughter and one by a collaborator
    - These are *primary sources* — writing from direct personal experience

Assessing our Progress

- Secondary sources like Biography.com provide quick introduction to material
- Primary sources give us most accurate specific information
  - Answers questions short biographies cannot, like the meaning of Dymaxion ("dynamic, maximum, ion")

Finding Video Clips

- Video clips of subject are also primary information
  - Fuller describing his ideas in his own words
  - Hear the conviction in his voice
  - See the emphasis of his gestures

Chronfile and Everything I Know

- Second result from Google search is a link to the Buckminster Fuller Institute (BFI)
- Timeline of Fuller's life
- Everything I Know: 42 hours worth of recordings
  - Also transcribed so it can be searched

Surfing the BFI Site

- Fuller's Dymaxion Map
  - Surface of the globe projected onto icosahedron, which produces a minimal distortion flat map

Figure 6.12 Dymaxion Map—an unfolding of a projection of earth onto an icosahedron.

Resolving Questions

- We know:
  - Fuller invented the geodesic dome
  - Fuller invented the Dymaxion Map
- Are they the same idea? If not, how are they related? How do we find the answer to these questions?
  1. Determine what kind of information will answer the question
  2. Look where that type of information may be found
     - In this case, the definitions of the two words may answer the question

Resolving Questions (cont'd)

- To define "geodesic" and "icosahedron", try an online dictionary

geodesic, *n*: The shortest line between two points on any mathematically defined surface.

icosahedron, *n*: A 20-sided polyhedron.

geodesic, *adj*: Made of light straight structural elements mostly in tension <a *geodesic* dome>.

geodesic dome, *n*: A domed or vaulted structure of lightweight straight elements that form interlocking polygons.

Secondary Sources

- Completing the Picture
  - Secondary sources can:
    - Give us a more thorough investigation of the topic and help us fill in gaps
    - Help us organize the information
    - Provide other authors' interpretations and insights
  - Remember to investigate the sources for authenticity

Investigating Controversial Questions

- Controversy regarding discovery of "tensegrity"
- Fuller's student Ken Snelson feels he was not given due credit for his part
- Find each party's version of events:
  - Snelson's version in an e-mail to International Journal of Space Structures
  - Fuller's version in "Everything I Know"

Exploring Side Questions

- Our sources have repeated mention of "buckminsterfullerenes." What are they?
- Google search on the term returns many useful links
  - From Scientific American to SUNY Stony Brook, to Michigan State University, to online dictionary, we find the answer:
    - A fullerene is a stable molecule of carbon composed of 60 or 70 atoms in the shape of a geodesic sphere

Case Study Wrap Up

- If we are going to use this information to write a report, we should create a summary file containing:
  - Bookmarks from the sites visited
  - Notebook entries of the search terms used
  - Brief notes of our impressions from the information we found — interesting discoveries, most useful sites, why we followed up some topics and not others, etc.

Fuller was born on July 12, 1895 in Milton, Massachusetts, the son of Richard Buckminster Fuller and Caroline Wolcott Andrews also the grandnephew of the American Transcendentalist Margaret Fuller. Spending his youth on Bear Island off the coast of Maine, he was a boy with a natural propensity for design and for making things.

Fuller was sent to Milton Academy, in Massachusetts. Afterwards, he began studying at Harvard but was expelled from the university twice: first, for entertaining an entire dance troupe; and second, for his "irresponsibility and lack of interest." By his own appraisal, he was a non-conforming misfit in the fraternity environment.

Between his sessions at Harvard, he worked in Canada as a mechanic in a textile mill, and later as a laborer in the meatpacking industry. He married Anne Hewlett in 1917, and also served in the U.S. Navy in World War I as a shipboard radio operator, as an editor of a publication, and as a crash-boat commander. In the early 1920s he and his father-in-law developed the Stockade Building System for producing lightweight, weatherproof, and fireproof housing—though ultimately the company failed.

In 1927 at the age of 32, bankrupt and jobless, living in inferior housing in Chicago, Illinois, his young daughter Alexandra died of the complications of polio and spinal meningitis. He felt responsible, and this drove him to drink and to the verge of suicide. At the last moment he decided instead to embark on "an experiment, to find what a single individual can contribute to changing the world and benefiting all humanity."

Figure 6.2 Excerpt from the Wikipedia biography for Buckminster Fuller.

Fuller, (Sarah) Margaret 1810–1850

Feminist, literary critic; born in Cambridgeport, Mass. Her father, Timothy Fuller, was a prominent Massachusetts lawyer-politician who, disappointed that his child was not a boy, educated her rigorously in the classical curriculum of the day. Not until age 14 did she get to attend a school for two years (1824–26) and then she returned to Cambridge and her course of reading. Her intellectual precociousness gained her the acquaintance of various Cambridge intellectuals but her assertive and intense manner put many people off.

From 1836 to 1837, after visiting Ralph Waldo Emerson in Concord, she taught for Bronson Alcott in Boston, and then at a school in Providence, R.I. All the while she continued to enlarge both her intellectual accomplishments and personal acquaintances. Moving to Jamaica Plain, a suburb of Boston, in 1840, she conducted her famous "Conversations" (1840–44), discussion groups that attracted many prominent people from all around Boston. In 1840, she also joined Emerson and others to found the *Dial*, a journal devoted to the transcendentalist views; she became a contributor from the first issue and its editor (1840–42). . . .

She went on to Italy in 1847 where she met Giovanni Angelo, the Marchese d'Ossoli, ten years younger and of liberal principles; they became lovers and married in 1849, but their son was born in 1848. Involved in the Roman revolution of 1848, she and her husband fled to Florence in 1849. They sailed for the U.S.A. in 1850 but the ship ran aground in a storm off Fire Island, N.Y., and Margaret's and her husband's bodies were never found.

Figure 6.3 Excerpt from Biography.com's biography of Margaret Fuller, RBF's great aunt.

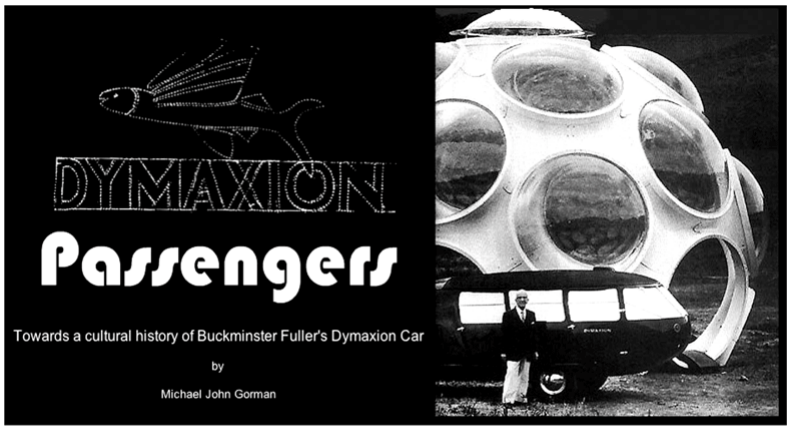

Figure 6.4 Splash page for the Dymaxion Passengers site, `shl.stanford.edu/Bucky/dymaxion/`, showing the Dymaxion Car and Fuller's Fly's Eye house.

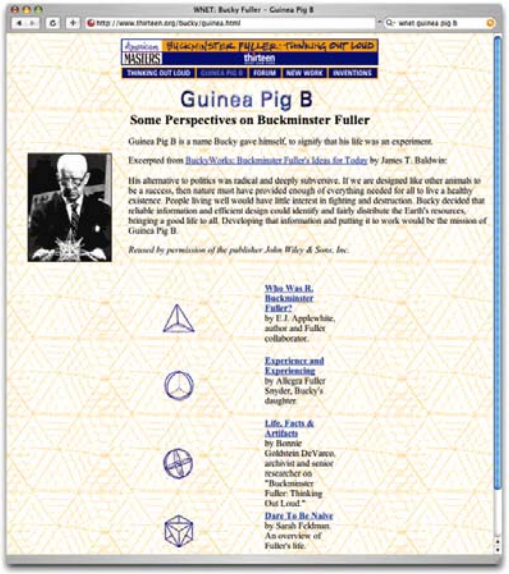

Figure 6.6 WNET's Guinea Pig B page (`www.thirteen.org/bucky/guinea.html`).

Who Was R. Buckminster Fuller?

by E. J. Applewhite

. . . Fuller rejected the conventional disciplines of the universities by ignoring them. In their place he imposed his own self-discipline and his own novel way of thinking in a deliberate attempt—as poets and artists do—to change his generation's perception of the world. To this end he created the term Spaceship Earth to convince all his fellow passengers that they would have to work together as the crew of a ship. His was an earnest, even compulsive, program to convince his listeners that humans had a function in universe. Humans have a destiny to serve as "local problem solvers" converting their experience to the highest advantage of others. . . .

Figure 6.7 Excerpt from the Applewhite essay at the WNET "Guinea Pig B" site.

Experience and Experiencing

by Allegra Fuller Snyder

. . . My father was a warm, concerned and sharing father. As focused as he was on his own work he nevertheless included me in his experiences and experiencing. I remember with great clarity when I was about four years old. I was sick in bed and he was taking care of me. He sat down on the bed beside me, with his pencil in hand, and told me, through wonderful free-hand drawings, a Goldilocks story. I was Goldilocks and with his pencil he transported me, not to the Bear's house, but to universe, to help me understand something of Einstein's Theory of Relativity. What he was telling me was neither remote nor abstract. I was in a newly perceived universe. I was experiencing my father's thoughts and he was experiencing his own thinking as he communicated with me. It was exciting. We were sharing something together and I felt very warm and close to him in that experience. Something of this episode was later remembered in a book called Tetrascroll. . . .

Figure 6.8 Excerpt from the Allegra Fuller Snyder essay at the WNET "Guinea Pig B" site.

Life, Facts and Artifacts

by Bonnie Goldstein DeVarco

Ephemeralization

Although the tactile pleasures of sorting through the physical artifacts of Bucky's life brings a dimension all its own to the discovery of who he was and who he shared his life with, almost the same could be done with the same body of materials available on a computer screen—from drawings, letters and manuscripts to "ephemerabilia," at the touch of a fingertip. In hundreds of letters spanning well over half a century, the love story of Bucky and Anne is told. Anne's letters carry a lilting youthful quality that punctuates even the most fatuous groupings of correspondence to be found in the Chronfile* boxes. Her handwriting is like a beautiful victorian stenciled wallpaper and her ardent and boundless devotion gives life to the saying that behind every great man is a great woman. It is no wonder he personally deemed his most famous geodesic dome, at the 1967 Montreal Exposition, his "Taj Majal to Anne" in honor of their 50th anniversary.

… And how affecting it is to see in a letter to his mother bound into the 1928 Chronfile volume, Fuller's youthful discovery of his Great Aunt Margaret Fuller's thought and its parallels to his own as he writes, "I have been reading much by Margaret Fuller lately. I was astonished to find that some things I have been writing myself are about identical to things I find in her writings. I am terribly interested and am astounded fully that I should have grown to this age and never have read anything of her or grandfather Fuller's." . . .

*RBF kept his correspondence and other documents in a bound file organized in chronological order called the Chronfile.

Figure 6.9 Excerpt from the DeVarco essay at the WNET "Guinea Pig B" site.

Dare to Be Naïve

by Sarah Feldman

Jobless, without savings or prospects, with a wife and newborn daughter to support, suicidal and drinking heavily, in 1927 Richard Buckminster Fuller had little reason to be optimistic about the future. R. Buckminster Fuller—or "Bucky," as he's affectionately known—transformed that low point in his life into a catalyst for transforming our planet's future as well as his own. ...

Renouncing personal success and financial gain, at age 32 Fuller set out to "search for the principles governing the universe and help advance the evolution of humanity in accordance with them." Central to his mission were the ideas that 1) he had to divest himself of false ideas and "unlearn" everything he could not verify through his own experience, and 2) human nature—and nature itself—could not be reformed and therefore it was the environment—and our response to it—that must be changed. Fuller entered into a two-year period of total seclusion, and began working on design solutions to what he inferred to be mankind's central problems. With his goal of "finding ways of doing more with less to the end that all people— everywhere—can have more and more," Fuller began designing a series of revolutionary structures. The most famous of these was the pre-fabricated, pole-suspended single-unit dwelling Dymaxion House. (The term Dymaxion was derived from the words "dynamic," "maximum," and "ion.") . . . Fuller's designs tended to be based [on] a geometry that used triangles, circles and tetrahedrons more than the traditional planes and rectangles. His Dymaxion Air-Ocean Map, which projected a spherical world as a flat surface with no visible distortion, brought him to the attention of the scientific community in 1943, and his map was the first cartographic projection of the world to ever be granted a U.S. patent.

A self-proclaimed "apolitical," Fuller maintained there was "no difference between [the] left and the right." Nevertheless, he admitted he struggled to "dare to be naïve," and retained an optimistic faith that "an omni-integrated, freely intercirculating, omni-literate world society" was within our grasp. A prolific writer, Fuller's magnum opus is undoubtedly "Synergetics: Explorations in the Geometry of Thinking," on which he collaborated with E. J. Applewhite in 1975. The work is considered a major intellectual achievement in its examinations of language, thought and the universe.

Though he only stood 5'2" tall, R. Buckminster Fuller looms large over the twentieth century. Though a man of incredible intellect and vision, many of "Bucky's" fans remain most impressed by the man's awe-inspiring humility—and his abiding love for his planet and his fellow human beings. "Above all," said Fuller, "I was motivated in 1927 and ever since by the most mysterious drive we ever experience—that of love. I don't think there's any influence upon my life that compares with . . . love."

Figure 6.10 Excerpt from the Feldman essay at the WNET "Guinea Pig B" site.

BUCKMINSTER

Home » Our Programs » Who is Buckminster Fuller?

Basic Biography

RBF, Anne and Allegra at the shore of Lake Michigan, Chicago, July 1928

Richard Buckminster Fuller
born in Milton, Massachusetts, July 12,1895, son of Richard Buckminster and Caroline Wolcott (Andrews) Fuller
Attended Milton Academy, (Massachusetts) 1904-13; Harvard 1913-15; U.S. Naval Academy, Annapolis, Maryland (spec.) 1917
Married Anne Hewlett, July 12,1917 at Rock Hall, Lawrence, Long Island, New York
Children: Alexandra Willets (dec.); Allegra (Fuller Snyder)
Grandchildren: Alexandra, Jaime

Figure 6.11 Buckminster Fuller Institute chronology of RBF's life.

Figure 6.13 Geodesic Done—
from the U.S. Pavilion at Montreal Expo 67.

A 20th-Century Philosopher

by Kirby Urner

. . . It was over this concept of "tensegrity" that early divisions over the issue of Fuller's character and integrity came to the foreground. Ken Snelson, a star pupil at Black Mountain College (1948), at first enchanted by Bucky's spell, became highly disillusioned when it appeared that Fuller planned to abscond with the "tensegrity" idea without properly crediting his student.

Fuller's reputation for egomania and improperly seizing upon others' ideas as his own may be traced to this Fuller-Snelson split, and led many to question whether the geodesic dome, widely credited to Fuller (who took out a number of patents around the idea) was another case in point. . . . Alexander Graham Bell had also made extensive use of the octet truss circa 1907, another one of Fuller's key concepts (also patented).

Fuller's own archives, maintained since his death in 1983 by the Buckminster Fuller Institute (BFI) and his estate (EBF), details his side of the story and he seems to have died with a clear conscience regarding these matters realizing they would remain bones of contention. . . .

Figure 6.14 Excerpt from Kirby Urner's biography of R. Buckminster Fuller, `www.grunch.net/synergetics/bio.html`.

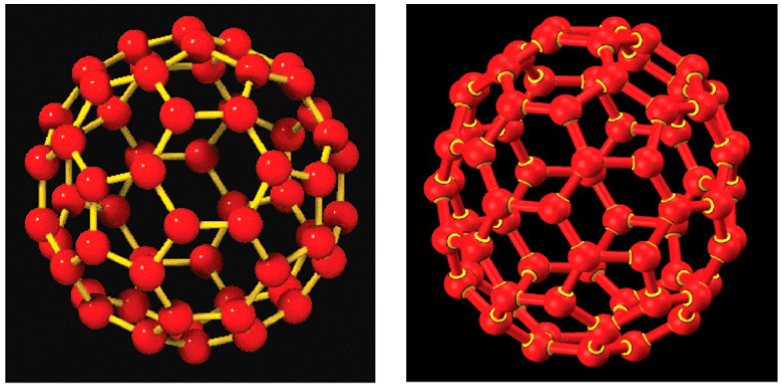

Figure 6.15 Images of buckminsterfullerenes, C_{60} and C_{70} (also known as fullerenes or buckyballs).

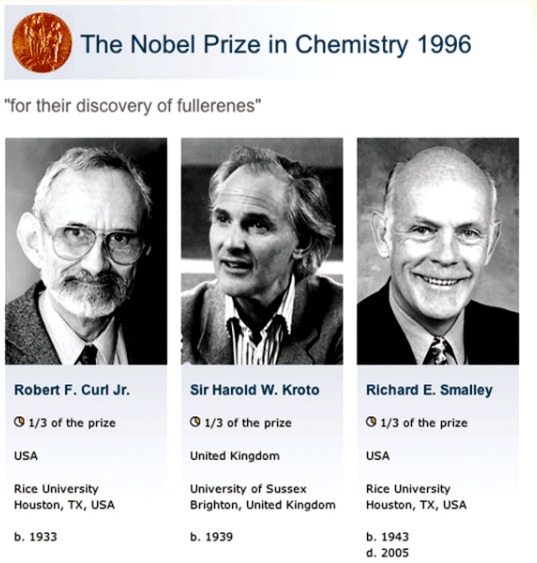

Figure 6.16 The Nobel Prize site for the discovery of the buckminsterfullerene.

Table 6.1 Record of the case study search

Begin with a Google search because "Buckminster" is a distinctive name; fail—too many hits
Restart by checking online biography sites to find some characterizing term; succeed—find "Dymaxion"
Learn basic facts about RBF's life, including that he is related to Margaret Fuller
Check online biography of Margaret Fuller—nineteenth-century feminist thinker, died in shipwreck
Click on Wikipedia biography—find different set of details
Check Google for further biographical material using "Dymaxion"; select a highly ranked biography
Find that he called himself "Guinea Pig B," a characterizing, personal term
Discover his "little, penniless, and unknown individual" quote and his dream of helping humanity
Check Google for images to find out what he looked like
Check Google using "Guinea Pig B"
Find WNET site and four essays: Applewhite, Snyder, DeVarco, and Feldman

Table 6.1 Record of the case study search *Continued*

Assess sources—Applewhite and Snyder are primary, DeVarco is archivist
Check on Feldman, first at biography site, then WNET personnel; writer with access to papers
Read Applewhite's essay for professional assessment—great intellect, creative, influential
Read Snyder's essay for RBF as father—warm, loving, deeply believed in primary experience
Read DeVarco's essay—the "ephemera" of RBF's life; he called Expo dome Taj Majal to Anne
Read Feldman's essay—threads RBF facts with personal aspects of success, tragedy, and family
Summarize our impressions of essays
View video clip; Fuller passionately argues world hunger/housing woes can be eliminated by 1985
Visit Buckminster Fuller Institute site
Check BFI's authenticity
Review Basic Chronology—married to Anne; two children, one died; many jobs, many awards
Discover *Everything I Know*—42 hours of audio
Listen to Fuller describe Allegra's asking him to become more animated
Discover Dymaxion map on icosahedron and watch animation
View the Montreal Expo 67 geodesic dome
Wonder how icosahedron and geodesic dome relate
Check dictionaries for definitions—unsatisfactory
Check dictionaries further and interpret definitions relative to map and Expo dome
Assess how complete our knowledge of Fuller is—decide to read another biography
Check the Kirby Urner biography found in the "Guinea Pig B" search
Check out Urner
Discover there is controversy over the originality of Fuller's ideas: Snelson, Bell
Check Ken Snelson, the sculptor
Check the *Journal of Space Structures* page giving Snelson's view of discovery
Return to BFI's site and *Everything I Know* for Fuller's view; he acknowledges Snelson
Check an interview with Fuller regarding independent discovery with Bell; he acknowledges it
Conclude that our knowledge of Fuller is reasonably complete and balanced for a start
Wonder what a buckminsterfullerene is, and use Google to find citations
Find using Google Images graphic renderings of C_{60} and C_{70}—geodesic spheres, not domes
Find a definition and the discoverers' names from Nanotechnology Lab
Look up *allotrope* in the dictionary and infer the difference from graphite and diamond
Wonder about the discoverers of buckyballs
Navigate Nobel site and find short biographies of the discoverers