Google Earth Meets Higher Ed: Reflections on Neogeography

Cathy Moulder, McMaster University
GOOGLE EARTH MEETS HIGHER ED: REFLECTIONS ON NEOGEOGRAPHY

Cathy Moulder
Director of Library Services, Maps, Data and GIS
McMaster University


This session came about because of a lot of “opportunities” in my life over the past year. McMaster University Library is changing over to a Liaison Librarian model in order to align ourselves more closely with trends in teaching and learning. This is not new in academic libraries, but it is a new connection to pedagogy for us. I also found myself co-supervising a University of Western Ontario Master of Library & Information Science student who was researching twenty-first century fluencies, a new direction in teaching literacy in which geospatial fluency plays a prominent role. Finally, I had a brief research leave to teach myself Google Earth. So, this session is my personal attempt at fitting these bits of new learning together and considering their significance to the world of geographic information at the university level.

Having only a limited amount of time, I’m not actually going to attempt to describe the state of the entire world of geographic information! To set a context, I’m going to comment on the phenomenon of Web 2.0 and describe some of the reported characteristics of our oncoming students (the NetGen). Next I’ll describe the concept of neogeography, which is the geographic manifestation of the concurrence of Web 2.0 and NetGen. Then I’ll talk about one particular neogeography (Google Earth) and look at how it is presently being used in higher education, which was the topic of my short research leave. The last section I’ve titled “What Next?”, but I guess I could have called it “So What?”: what is the significance of these trends?

Web 2.0

The phrase “Web 2.0” was coined in 2004. Some have suggested that it is just the natural evolution of the Internet, but many believe it is actually a change in the basic paradigm for control of the creation and use of information on the World Wide Web. In the first generation Web, authorities prepared web page content and users passively viewed “read-only” material. That publication model was “one to many”. The web page creator held all control over content. In Web 2.0, users have the ability to create content. Content is no longer the domain of authorities. Anyone can contribute. So the publication model is “many to many”.

Another notable characteristic of Web 2.0 is that users have access to remote applications that function as if they were locally-installed software. But perhaps the most dominant characteristic of all is its social nature, and in fact Web 2.0 is often called “the participatory Web”. Second-generation Web-based services emphasize online collaboration among end-users. Users are encouraged to participate, and to share and re-use content. Everybody co-creates and adds value to a shared project. Some examples of Web 2.0 applications are social networking sites, file-sharing sites, wikis, blogs, folksonomies and mashups, to name just a few.

These widely-reported characteristics certainly make it sound like Web 2.0 is a strong populist movement at the grassroots level, leading to greater democracy and social justice in access to the Internet. But realistically, many of the innovations are being leveraged by the big players (Google, Yahoo, Amazon and eBay).

NetGen Students

There are many articles and reports in the literature about the differences that have been observed in the people who were born after 1982 and about their impact on the education system. The most
entertaining description I've found is the article by Marc Prensky titled “Digital Natives, Digital Immigrants” (Prensky, 2001). Prensky defines a digital native as a person who has never known a world without computers. As a result they are “native speakers” of the digital language of computers, video games and the Internet. A digital immigrant is a person like me (and maybe some of you) who was not born into a digital world. Digital immigrants learned the language and adapted to the new land, sometimes very successfully. But we always retain an “accent”, because digital is not our native language. Do you ever print things out to read them? That’s an “accent” coming from a digital immigrant. Do you read software manuals rather than just assuming you can learn by pressing the buttons? If you’ve ever called somebody to ask if they got your email, that would be a really strong accent! Prensky goes so far as to suggest that there are actually brain differences in the NetGen learners, but I’m not convinced about that. Certainly there are some widely reported general characteristics among the students who we are now seeing at universities.

The most obvious characteristic of the Net Generation is their sociability. Everybody is connected—by cell phone, by instant messaging, by FaceBook, by blogs and wikis, by Massive Multiplayer Games. Social networking is THE most important activity of every moment. In terms of achievement and goals, the NetGen students prefer clearly structured tasks; they don’t like the ambiguity which we used to consider “exploration and discovery”. They are experiential. Students no longer ask, “What does it mean?” or “How does it work?” They ask, “How do I build it?” They are very hands-on and want to create things themselves. NetGen students are very visually oriented. They have spent a lifetime immersed in graphics and are often more comfortable with visual information than with text. Finally, NetGen students are apparently very interested in participating in community activities and community building activities. This is good news for all of us, as the Earth certainly could use more citizen activists. For more information on NetGen characteristics, see Oblinger and Oblinger, 2005.

**Neogeography**

When Web 2.0 and the digital natives meet geographic information, there is an area of development on the Internet that’s being called “neogeography”. Neogeography can be defined as “use of the Web to create, assemble and disseminate geographic information provided by individuals” (Goodchild, 2007). The important part of this definition is that phrase “information provided by individuals”. This doesn’t mean just seeing maps on the Internet; it means the adaptation of the whole Web 2.0 philosophy, where the user is the publisher and the end goals are social and sharing. Control is no longer in the hands of the trained professionals. Michael Goodchild has used the term “volunteered geographic information” in a couple of recent articles to emphasize the non-expert nature of the information creation and exchange. Neogeography applications consist of techniques and tools that fall outside the realm of traditional GIS or professional cartography. Neogeography is about web-based applications where the animals appear to have taken over the farm (although of course there are multi-national agricorps in the background).

Here are a few examples of neogeographies:

- **Wikimapia (http://wikimapia.org)**
  A wiki (or website that is developed by public contributions) with a world map base. Contributors annotate places with photos and text, in a project aimed at having volunteers describe the world.

- **Panoramio (http://www.panoramio.com)**
  A photo-sharing website that is based on geographic location. Uploaded photos are geo-referenced and displayed in Google Maps or Google Earth. Visitors may share the scenery of a location in the photographs of others.

- **Google Maps User-created Content (http://maps.google.com)**
  It is possible to delimit your Google Maps search to just content that is user-generated using the drop-down menu under Search Options. This reveals a sub-set of Google Map placemarks that have been supplied by individuals or companies.

- **GeoGreeting (http://www.geogreeting.com)**
  A charmingly trite website that allows the user to send a message encoded on a map of the world. Individual letters in the message appear as air photos of buildings or of sites with a similar physical shape, geo-located on a world map.
You can probably name a dozen more neogeographies yourself, as this subsection of the Internet is growing rapidly. As you can see from these examples, the commonalities play on Web 2.0 and Net Generation characteristics: they are remote websites operating like locally-installed interactive applications, they are participatory and typically non-expert, they are focussed on sharing and community-building, and they are predominantly social.

Research Project

My recent research leave offered an opportunity to investigate the conjunction of some these concepts. I have learned that there are interesting new Internet developments in Web 2.0 and neogeography. Furthermore, our oncoming students are very engaged by this kind of tool. As university educators, we would like to capitalize on their digital native interests to foster learning. We already have a variety of geographic information tools that we use in teaching at the university level. So is there an area where we could move into neogeography tools and add them to our teaching repertoire in a way that will engage students and foster geographic learning?

Because my research leave was very brief, I had to narrow it down to just one possible neogeography tool. A lot of the NeoGeo toys are pretty trivial. I deliberately chose to look at Google Earth (and Google Earth Pro), because I see them as having solid educational potential. I thought I’d start by trying to track down existing assignments (rather than re-inventing the wheel). If I can get an idea of what kinds of assignments use Google Earth, then I can help McMaster faculty to adopt it in similar exercises. There is a LOT of educational material out there about Google Earth, so I deliberately restricted my investigation to university-level assignments.

What’s Out There? Existing Google Earth Assignments at the University Level

Here are some of my early findings. Being a good librarian, I started with a literature search. Of course, I found that published literature is pretty scant. The majority of information is found in geology and earth sciences journals (which can be located using GeoBase, GeoRefS or Scholars Portal) and occasionally in the computer literature (which can be located using Thomson Gale Computer Database). At this point (May 2008), there’s very little in the published literature beyond enthusiasm for using Google Earth as a tool in teaching, and most articles are out-of-date before the ink is dry.

Not surprisingly, there’s a lot of information about Google Earth on the Internet. There are many blogs and web-based help sites, such as the following examples:

- Google for Educators (http://www.google.com/educators/p_earth_discovery.html)
- Google Earth Outreach (http://earth.google.com/outreach/)
- Juicy Geography (http://www.juicygeography.co.uk/)
- Ogle Earth (http://www.ogleearth.com/)
- Google Earth Blog (http://www.gearthblog.com/)

Google supports some of these websites; others are created by individuals. Juicy Geography is a particularly good site run by Noel Jenkins, an English educator. He’s probably a high school teacher but his blog shows a lot of emphasis on pedagogy. Most of the Internet resources about Google Earth focus on elementary and high school education. There is a lot of excitement and enthusiasm—what I would call “wow” factor—about the potential for Google Earth in education, but there’s not much being written about higher education.

I also investigated conference proceedings to find out where Google Earth is being talked about. It is featured at “Where 2.0”, one of the cutting-edge O’Reilly Web 2.0 annual conferences, but this conference seems to attract a lot of map hackers and not too many educators. The website “Virtual Globes in Science” (http://conferences.images.alaska.edu/) offers good potential as a source for tracking future conferences of interest. The most active scholarly group so far—in terms of talking anyway—has been the Geological Society of America (presentation topics can be located using GSA Abstracts with Programs). There are still not very many examples of educational assignment use evident through conference programs. Most of the assignments I’ve been able to track down have come from individuals contacted through conference abstracts.
What I did find is that there are many people posting their KML and KMZ files to various sites on the Web. Examples of such file-sharing sites are:

- Ogle Earth Link List (http://www.ogleearth.com/links.html)
- Google Earth Lessons–Link Bucket and KMZ Bucket (http://www.gelessons.com/lessons/)
- Google Earth Community (http://bbs.keyhole.com/ubb/)

This of course is one of the characteristics of Web 2.0—people are eager to share. Some of these files are just personal trash, but a lot of them are—or at least could be—quite useful for student use. And I suppose it’s evidence of my digital immigrant accent that I would expect a silly thing like metadata to accompany a data file! There are virtually no metadata provided for any of this “volunteered geographic information”.

One of my conclusions from this brief search for existing Google Earth assignments at the university level was that we are just ahead of full implementation. There are several publications still in press—right on the cusp of release—that are going to include student assignments using Google Earth. One example is a new earth sciences textbook called Geosystems: An Introduction to Physical Sciences, 7th edition (Prentice Hall, 2009). Accompanying the textbook will be a lab manual of student exercises (Figure 1). And accompanying the lab manual will be a website of supplemental questions that all require the students to use Google Earth to re-enforce the topics of the chapter. A salesman sent me the copy illustrated in Figure 2 as a pre-publication sample.

Another new book is Teaching College Geography by Solem and Foote (Prentice Hall, 2009) (Figure 2). This one is available now despite the publication date of next year. It will apparently have an accompanying website of student exercises, including virtual globe assignments, but the website is still displaying a little notice that it’s not ready yet (as of May 2008). So these are two pieces of commercial evidence that we are just ahead of the curve of adoption in terms of teaching use at the university level. I think we can safely say that in the next year there is going to be a massive bloom of available student assignments using Google Earth.
Characteristics of Existing Student Assignments

Figure 3 shows an analysis of the student assignments that I have found so far. During this brief research project, I located 14 existing assignments that use Google Earth at the university level. In these assignments I identified a total of 110 tasks that the students are required to do. I have arranged these tasks in categories on the chart in roughly hierarchical order, with the simpler tasks on the left side of the chart. The tasks on the right side are more complex, or they require some software in addition to the simple free version of Google Earth. Two tasks (“Analysis based on visualization” and “Measure and calculate”) are a bit ambiguous. Sometimes the expectations of these tasks are pretty simple, but they actually could be ramped up to a more significant level of learning depending on the example used.

I think this chart shows that, up to this point, most of the required tasks are at a pretty simple level—locating, identifying and measuring kinds of questions. There are a very few early adopters pushing the envelope and really exercising the tool (which means requiring complex combinations of tasks or the tasks on the right-hand end of the scale). Although most of the assigned tasks are still pretty light-weight, the exercises are probably engaging students’ interest and most are accomplishable using the free version of Google Earth.

What Next?

So these are just a few of the things I’ve learned so far. Is Google Earth worth considering as a teaching tool at the university level? Yes, I think so. The faculty members I contacted during the course of this investigation are pretty enthusiastic about incorporating Google Earth into their lessons. One
professor, who is presently using Google Earth in a
géology assignment, told me that her students are
getting a three-dimensional understanding of
outcrops and structural patterns that is not possible
with any other kind of data.

Michael Goodchild, one of my favourite leading-
edge geographical thinkers, has written a couple
of the best articles in the last year about the role
of “volunteered geographic information” in
higher education (for example, Goodchild, 2007).
Because neogeographies are generally non-
expert and might even be seen as competition
for the traditional cartography and fully
functional Geographic Information Systems that
universities now teach, I was rather surprised to
learn how very positive he is about this trend.
Goodchild has expressed the conviction that tools
like Google Earth will increase awareness of GIS,
and lead researchers and students on to explore
more powerful GIS techniques (Butler, 2006).
People will start out using Google Earth as an
excellent visualization aid and then be drawn
into deeper forms of analysis. Presently it is
estimated that about 100,000 students worldwide
study GIS, which is a very tiny proportion of
participants in the world’s educational system in
any one year (Goodchild, 2006). Neogeographies
offer great opportunities to raise the geographical
awareness of a larger number of students. Even if
these students don’t immediately go into GIS, at
least they are becoming more earth-conscious
citizens.

I think the greatest strength of Google Earth in
terms of our teaching goals is its appeal to the
NetGen students. We know that our ultimate goal
is to produce spatially fluent citizens who will
make good earth decisions in the future. Google
Earth is intrinsically a tool that will appeal to
the characteristics of the digital native students.
It’s visual, fast moving and interactive. It allows
a simulation of experience. It plays like a game.
And if students are engaged by the tool there is a
strong likelihood that they can also be engaged
by an impelling geographical question that
requires them to use the tool.

Simple questions take advantage of the fun
features and engage students’ interest briefly,
which is okay. But more substantive questions,
those that really engage the students on a deeper
level of understanding of the earth, are the ones
that will stimulate critical thinking and foster
spatial fluency. The quality of the research
questions—the tasks assigned—is really critical
to making Google Earth a successful tool for
learning. As academic librarians, we can play a
significant role in encouraging and assisting our
faculty partners to adopt neogeography tools in
teaching and to employ them in ways that ask
substantive questions and foster life-long
curiosity.

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