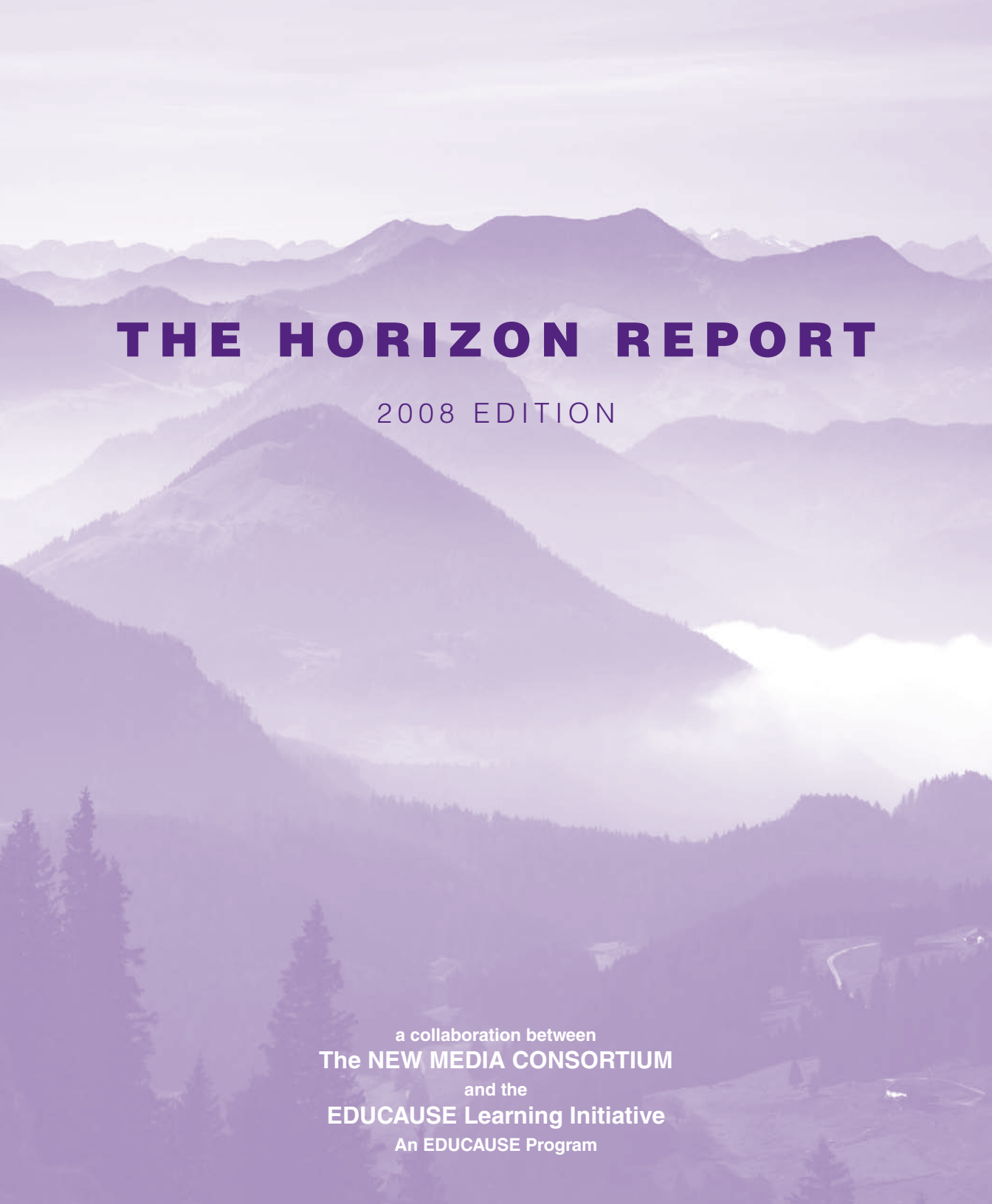

THE HORIZON REPORT

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The NEW MEDIA CONSORTIUM

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DATA MASHUPS

Time-to-Adoption Horizon: Two to Three Years

Overlay the location of every Flickr photo tagged with "bluejay" on a map of the United States and see where people are finding blue jays (www.flickr.com/map). See Twitter updates from your geographical area (www.twittermap.com) or follow the global progress of the public stream (www.twittervision.com). Each of these applications is a mashup: a combination of data from multiple sources in a single tool. Mashups have been around for several years, but in recent months they have captured greater interest, due in part to a broader exposure from their integration with social networking systems like Facebook. While most current examples are focused on the integration of maps with a variety of data, it is not difficult to picture broad educational and scholarly applications for mashups.

Overview

A *mashup* is a web application that combines data from more than one source via a single, unified tool.[4] Mashups are often about data visualization, but they can also be creative products of other kinds—indeed, the term "mashup" originates from the music industry—such as assorted film and music clips assembled into parodies of well-known productions, for instance. Data mashups are powerful tools for navigating and visualizing datasets; understanding connections between different dimensions such as time, distance, and location; juxtaposing data from different sources to reveal new relationships; and other purposes.

Tools like Google's *Mashup Editor* (code.google.com/gme/) make it relatively easy to create applications that grab online data, organize it, and display it the way the author wants. For example, the U.S. Environmental Protection Agency (EPA) has created a *Google Earth* mashup that generates maps of the U.S. displaying air quality based on the amount and kind of pollutants emitted by businesses (www.epa.gov/air/emissions/where.htm). This mashup requires viewers to download and install *Google Earth,* a free application; but most mashups are web-based and require no download. One such mashup, created by László Kozma, combines data from *Wikipedia* and *Google Maps* to identify the location of authors posting updates to *Wikipedia* almost in real-time (www.lkozma.net/wpv/).

Yahoo! Pipes (pipes.yahoo.com) is another mashup authoring tool. *Pipes* allows users to combine, filter, and display RSS content from all over the web. Finished "pipes" can then be published, shared, and embedded in other web pages. A pipe could pull updates from a handful of educational blogs, for instance, filtering the posts so that only those about technology, say, or physics, are received. Developers can also create and add additional modules to expand the functionality of the authoring tool. A specially formatted version is available for the *iPhone* (iphone.pipes.yahoo.com) that includes a "map" button to plot the results of any geographic pipe onto the *iPhone's* Google map with a single tap.

Geotagging, the practice of adding geographical metadata like latitude, longitude, altitude, and/or placenames to images, websites, or other media, has already ushered in compelling forms of data mashups that illustrate the potential of this practice for education. Mashups that make use of geotagged data let us plot information against the landscape of the real world to visualize phenomena and datasets in ways that make spatial and temporal relationships transparent and obvious. More and more, geo-information is becoming a characteristic embedded in everything around us, and mashups are the tools that enable us to reach in and put that information to use.

Relevance for Teaching, Learning, and Creative Expression

Mashups are very common on the Internet today, and new authoring tools are being developed that will

4 *Wikipedia,* "mashup (web application hybrid)," retrieved December 2007.

enable non-technical users to create sophisticated products without programming. As tools like these become more robust, we will see increasing use of data mashups in teaching and learning. Faculty will create custom mashups to illustrate concepts as they teach; students will include them in reports and assignments. Already new forms of visualizing data and relationships are changing the way we think about the world.

The power of mashups for education lies in the way they help us reach new conclusions or discern new relationships by uniting large amounts of data in a manageable way. Web-based tools for manipulating data are easy to use, usually free, and widely available. Research can be displayed on interactive graphs, charts, or maps that make the concepts clear.

Mashups of geotagged data have obvious applications for education; researchers can use public, tagged media to create mashup maps with embedded annotations. These "hyperlocal" annotations—minute details about a specific location in the form of everyday photographs, blog entries, and video clips—offer opportunities for research that were previously only available by actually living in the location in question. Digital photographs taken with GPS-enabled cameras automatically capture precise geographic/locative information; when uploaded to services like *Flickr,* the photos "know" where they were taken, making them readily available for geo-based mashups.

Creative mashups have educational applications as well, in teaching and learning as well as in creative expression. Mashups made from pop culture sources can demonstrate mastery of subject matter, understanding of cinematic and literary themes, social awareness, and more. At the University of Pennsylvania, a contest called for students to produce mashup video parodies of popular movies (see the presentation at wic.library.upenn.edu/mashup/cni2007.html for details). Creative mashups and remixes are themselves an art form—but they can also be an effective presentation tool.

A sampling of applications of data mashups across disciplines includes the following:

- **Criminal Justice.** At the Rochester Institute of Technology, a criminal justice course integrates local criminal statistics, population data and census data using GIS mapping software, graphing data and statistical analysis tools to study and attempt to better understand the problem of violence and homicide in the city of Rochester, New York.
- **Education.** A research project at the University of Oregon has created a tool that allows users to collect data about objects in the virtual world of *Second Life* and export it to a website. The tool is designed to be used to catalog educational objects that can be found in the virtual world (see blip.tv/file/571587 for a video overview).
- **Library Services.** Libraries—including those at the University of Calgary, Baylor College, McMaster University, and public systems in Topeka and Chicago, among others—have begun integrating a *MeeboMe* mashup that lets patrons send instant messages to a live librarian while using the library's online services (catalog search, reservations, etc).
- **Public Policy.** At the University of Oregon, a freshman seminar on investigating natural disasters and the response of governments, nonprofits and individuals to them uses the Havaria Information Services Alerts Map mashup (see below) to monitor current natural events as they develop.

Examples of Data Mashups

The following links provide examples of educational applications of data mashups.

Havaria Information Services Alert Map
hisz.rsoe.hu/alertmap/index.php?lang=eng

This interactive map displays data relating to severe weather conditions, epidemic alerts, and seismic incidents around the world. Created by the National Association of Radio-Distress Signalling and Infocommunications (RSOE) in Budapest, Hungary, the map draws from over 200 news sources for the information it displays.

Interactive Learning Resources at Michigan State University
clear.msu.edu/teaching/online/ria/

Michigan State University offers a set of webware apps that allow faculty to mashup interactive language learning resources on the fly.

Interactive Map Tool
www.cer.jhu.edu/index.cfm?pageID=351

This web-based authoring tool, developed at Johns Hopkins University, supports digital field assignments and allows students and instructors to create custom mashups using a wide variety of digital media, text, and data.

Minnesota Interactive Internet Mapping Project
maps.umn.edu/

The Minnesota Interactive Internet Mapping (MIIM) Project is developing an internet mapping application that provides digital maps and imagery similar to *Google Maps* or *MapQuest;* the project involves educators in designing the tool to identify features necessary for instruction, including a broad range of data, interactivity, security, ease of use, customization, analytical capabilities, low resource demands, and sustainability.

Research at Pompeu Fabra University
www.girardin.org/fabien/tracing/

Researchers at the Pompeu Fabra University in Barcelona are mining the spatial-temporal data provided by geotagged *Flickr* photos of urban locations.

For Further Reading

The following articles and resources are recommended for those who wish to learn more about data mashups.

ABS to Open up Data for Online Mapping
www.zdnet.com.au/news/software/soa/ABS-to-open-up-data-for-online-mapping/0,130061733,339282984,00.htm

(Angus Kidman, ZDNet Australia, October 16, 2007.) The Australian Bureau of Statistics plans to release its data for use in online mashups in 2008.

The Mash-up Future of the Web
news.bbc.co.uk/2/hi/technology/6375525.stm

(Bill Thompson, BBC News, February 19, 2007.) This article discusses the effect mashups may have on the Internet in coming years.

Mashing on the Library, Part I
theshiftedlibrarian.com/archives/2007/12/04/mashing-on-the-library-part-i.html

(Jenny Levine, The Shifted Librarian, December 4, 2007.) This blog post describes the *MeeboMe* mashup being used by libraries to allow patrons to send instant messages to librarians while searching the library's catalog.

Mishmash of Mashups
waynehodgins.typepad.com/ontarget/2007/07/mishmash-of-mas.html

(Wayne Hodgins, Off Course—On Target, July 25, 2007.) This blog post explains what mashups are (and aren't) and suggests why they are useful for education.

***del.icio.us:* Data Mashups**
del.icio.us/tag/hz08+mashup

(Horizon Advisory Board and Friends, 2007.) Follow this link to find resources tagged for this topic and this edition of the *Horizon Report,* including the ones listed here. To add to this list, simply tag resources with "hz08" and "mashup" when you save them to *del.icio.us.*