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New Media Technologies: Proposing An Integrated Approach

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1. INTRODUCTION

Astronomy is perhaps the science that can benefit most from the rise of new media technologies such as podcasts, blogs, and virtual communities. The visual nature of astronomy, its technically literate practitioners, and near universal appeal can be combined to embed astronomical news and information in these new networks.

Two properties of these new technologies may account for their rapid adoption. First, they involve an element of networking, allowing some content choices to be made by friends of the content consumer, or user. By involving friends with similar interests, users of the new technologies offload some of the workload of identifying interesting content by sharing resources with their like-minded friends. This feature can play an important role in the dissemination of information about astronomy. A recent survey showed that roughly two-thirds of the ~15,000 weekly listeners to the podcast Slacker Astronomy claim that podcast as their sole channel for astronomical news (Price et al. 2006). This result shows that, although astronomy news and information, in general, is well regarded by the public, interest is not high enough for most of the public to actively seek out astronomical news from multiple sources on a regular basis.

The second attractive feature of these new technologies is that they allow users to consume content on their own terms by providing media and scheduling choices and automated delivery based on those choices.

The purpose of this commentary is to describe some of the media channels that are even newer than podcasts and to discuss some of the technical and cultural challenges that must be addressed in order to use each effectively for dissemination of information about astronomy.

2. NEW MEDIA TECHNOLOGIES

2.1 Blogs

Astronomy is already well represented in the blogosphere. The Astronomy Blog (http://www.strudel.org.uk/blog/astro/index.shtml), Bad Astronomy (http://www.badastronomy.com/bablog/), the Visualizing Science Blog (http://ryanwyatt.livejournal.com/), and Slacker Astronomy (http://www.slackerastronomy.org) give a glimpse into the daily lives of astronomers and also provide insider news. There are other blogs that are usually dominated by press release coverage and amateur news. Examples of such blogs are *Sky and Telescope*'s SkyTonight blogs (http://skytonight.com/community/skyblog), the Astronomy.com blog (http://www.astronomy.com/asy/cs/blogs/astronomy/default.aspx), Space.com's LiveScience blogs (http://www.livescience.com/blogs/), Universe Today (http://www.universetoday.com), and MSNBC's Cosmic Log (http://cosmiclog.msnbc.msn.com/; active since 2002).

There is a striking absence of regularly maintained blogs hosted by major astronomical institutions even though observatories, astronomical departments, and research institutions could use blogs to communicate directly with the public—bypassing the gateways and filters put in place by press releases. Blog writing is typically characterized by a less formal communication style and generally fewer content restrictions. Blogs also include direct feedback from the readers. This informal style and direct feedback break down barriers and foster a sense of community among the readers and writers. Setting up a blog takes only a matter of hours for an experienced webmaster or IT specialist. After the initial setup, maintenance is very minor. If each member of an institution's staff was encouraged to write one entry per month, the blog would be quite active without placing an excessive burden on a single staff member.

2.2 Audio and Video Podcasting

Audio podcasting is an area in which astronomy has also made inroads, but not at the same level of success as in the blogosphere. The first sustained astronomically themed podcast was likely Science@NASA (http://science.nasa.gov/podcast.htm), an audio recording of the Science@NASA Web page. The first original content astronomical podcast was Slacker Astronomy (Gay, Price, & Searle 2006; Price et al. 2006). There are a few other original content astronomical podcasts, usually produced by institutions, but other than AstronomyCast (http://www.astronomycast.com) and Slacker Astronomy, they have never challenged the other general science podcasts for high positions in the iTunes podcast popularity rankings. Why? Much of the public appeal of astronomy is the result of its striking images. Without visuals, strong personalities are needed to provide the content in an attractive manner, and most astronomical podcasts lack personality and are basically Web pages and blogs read into microphones.

Astronomy has had more success with video podcasting (a.k.a "vlogging" and "vodcasting"). Video podcasts by NASA and PBS/Nova have emerged as consistently popular shows in the iTunes rankings. It is perhaps no surprise that such successful podcasts come from established entities with their own high-quality production departments and multimedia expertise. However, video podcasts can be as simple to produce as audio podcasts. Short, professionally produced shows can be created using free software from Apple (iMovie), and video can be shot on most consumer-level digital cameras these days. Video and animations that have already been released into the public domain (such as most NASA materials) can be easily dropped into a video podcast to provide high-quality illustrations of the topic. But even a step back

to simpler videos can work. The most popular Slacker Astronomy video illustrates the supernova process using Lite Brite diagrams photographed with a digital camera. It has been seen by over 30,000 people and won a few popularity awards when it was placed online at YouTube in September 2006.

YouTube is currently the site du jour for video downloads, with millions of daily visitors and a market value in the billions. The astronomy offerings on YouTube are meager, and most do not even involve the science of astronomy (a band called "Astronomy" is quite popular on YouTube). The YouTube community would be well served by the creation of a collection of quality astronomical videos. Uploading to YouTube is very simple and only takes a few minutes. YouTube accepts video in a wide variety of formats and in lengths up to 10 minutes (or 100MB in size, whichever comes first; Google 2006).

2.3 Social Networking Sites

Social networking sites offer a quick and efficient channel for dissemination of content to a younger audience. In social networking sites, users have their own blogs. They also denote the blogs of other friends. The blogs are united so that a post in one blog will show up as a post in all the linked blogs. Therefore, if one posts in a blog that has been "friended" by many people, the post instantly is distributed to all the others. This genealogy can go on and on almost indefinitely, limited only by the number of friends interested in the topic. Overall, this effect is termed "viral marketing."

Most social networking sites have theme-based communities, including communities focused on some aspect of astronomy. A post to one of these communities can branch out into the blogs of all the members of the community. A single post in the LiveJournal astronomy community, for example, reaches around 4,000 members. Any of the members can flag it to appear in their own journals and in the journals of their lists of friends. This explosive growth pattern is what differentiates social networking sites from typical e-mail lists.

The challenge of social networking sites lies in their demographic. Most are dominated by teenagers (e.g., MySpace) or young adults (e.g., LiveJournal). Effective content must be respectful of that demographic. Short messages in an informal style work best, with clearly placed links to more details and multimedia aspects. Prospective contributors can adapt to the expectations of this culture by reading material in the existing forums and communities first and then attempting to fit text into the culture that already exists. Language copied and pasted from a press release is unlikely to attract a large audience. One way to start is by creating accounts on the sites and monitoring the astronomy communities. Following them consistently over time will provide a better perspective on how these networks interact socially. In most of the astronomy communities, it is possible to use the message content to identify other astronomers or students of astronomy who are already participating. These astronomers can be contacted to help get messages out or perhaps even to make posts on the behalf of others. Alternatively, make a few posts and post comments to other posts to build a relationship with the members. Then, when the time comes to announce an interesting discovery or news item, the audience is already assembled.

2.4 *Second Life* and Virtual Communities

In virtual communities, users assume a persona in a graphical environment that is an approximation of real-world physics. In that environment, they interact with other users through a first-person likeness called an avatar. The most popular virtual communities are action games in which users play roles in story-telling, such as Everquest and World of Warcraft. The most popular non-game-based virtual

community is called *Second Life*. Second Life is unique in that the users create the virtual world they inhabit. They build houses, businesses, program games, and so on. Because of its more open and mature nature, Second Life has become a popular place for virtual education programs too. Second Life offers special services and discounts to educators—it is free to participate in Second Life as a visitor but costs a monthly fee to build things—and also has "PG" and "teen" areas where adult content is not allowed. Many corporations have built virtual stores in Second Life to sell real-life products and services. Even the United Nations has recently opened an office in Second Life.

Astronomy is well represented in Second Life. Space Shuttle launches, eclipses, and other astronomical events have been rebroadcast in Second Life. The San Francisco Palace of Fine Arts' Exploratorium has built an elaborate museum hall with astronomical exhibits and 3-D models of eclipses. Slacker Astronomy has built a planetarium that shows both audio and video podcasts on the walls. By far, the most elaborate astronomically themed project in Second Life is the International Spaceflight Museum (ISM; Figure 1). In 2006, a group of space exploration enthusiasts pooled their resources to purchase a virtual island in Second Life (the going rate for an island as of January 2007 is US $1,700 to create and US $275/month to maintain, although one can apply for an educational discount of 25%). On the island, named Spaceport Alpha, they built the ISM as a museum dedicated to space exploration. The museum has a working planetarium with NASA content, a replica amateur telescope, an amphitheater that displays a live feed from NASA TV on two large screens, and over 50 intricately detailed scaled replicas of both modern and historical spacecraft (Crider 2007).

Figure 1. An Avatar Visiting the International Spaceflight Museum in *Second Life*

The most useful aspect of virtual communities is in the community itself. The graphical technology of Second Life, for example, is notably behind that of the larger virtual gaming companies. However, the community of Second Life makes up for it by building unique areas like the ISM. Users also self-organize into clubs and organizations. For example, a community of science enthusiasts in Second Life distributes a weekly newsletter of upcoming science events in Second Life. NASA, the ISM, and Slacker Astronomy have hosted online talks in Second Life, bringing in experts to converse with Second Life users on a variety of astronomical topics.

Another advantage of virtual communities is their ability to create an environment around the user. Many studies of situated cognition (Lave 1988) have shown that a line cannot be drawn between the student and the student's environment (Brown, Collins, & Duguid 1989). The acquisition of knowledge through transfer is difficult when the original task is not presented in a real-world environment (Lave). Although the education aspect of these environments has yet to be rigorously studied, the possibility is there, and there are many nonastronomical educational projects currently under construction using this technology (Barab et al. 2005; Dede et al. 2004; Foley & La Torre 2004). As a possible astronomical example, the construction of an observatory on a remote mountaintop in Second Life could illustrate the importance of altitude and other factors in the placement of observatories. Users could "fly" around the mountain and watch how the sky changes as they gain in altitude, while at the same time watching the effects on their bodies.

3. CONCLUSION

There are two key strategies that should be adhered to while implementing these technologies into an education and public outreach program. First, use the unique aspects of each technology effectively. Simply throwing a press release on a Web site and reading it into an audio microphone will not cut it. Preparing material for the new media is similar to the art of stagecraft, in which a play must be written for the stage exclusively—not for the screen or print—or else it suffers from lack of focus and clarity. When an education and public outreach program is being designed, define the program goals, evaluate the available technologies, and choose the ones that are appropriate.

Second, it is important to be a consumer as well as a provider of information in each of these technologies. The cultural dimension of the technologies is very important. For almost all of them, users have avenues to provide feedback on your material. As in business, word of mouth is very important. As soon as one gains a negative reputation (which online includes something as seemingly innocuous as being seen as "boring" or slow to update), then the networking aspect of technology turns against you. The best way to avoid this is to become familiar with and comfortable in the communities that have arisen around the technologies. This means more than just reading articles like this; it requires the routine monitoring of online discussion and, if possible, contributing to the discussion. For example, a public information officer (PIO) at a radio observatory may wish to comment on an optical astronomy blog topic if relevant radio data are also available.

It should neither be difficult nor resource intensive to integrate new media technologies into existing education and public outreach programs. A major challenge, however, will be finding ways to evaluate the effectiveness of these new tools. Large audiences are being reached, but are people in these communities learning and retaining information about astronomy? Some initial steps toward evaluation of podcasts have already been reported and are encouraging (Price et al. 2006), and I would encourage more research into the effectiveness of these other new tools.

Whatever the challenges of evaluation, the educational role of the new media is clearly worth exploring. In many ways, the content is no different from what is conveyed by conventional teaching methods in that it relies on words, images, and animation, with the possibility of a strong interactive component. The new media used for presenting that content do differ from more traditional educational settings in how the information is received by users and integrated into their lifestyles. As lifestyles change, however, it is likely that the most effective educational strategies will evolve as well.

With this commentary, I hope to persuade readers that the perceived difficulty in understanding these tools is not an obstacle to using them. The proven success they have in reaching large, new audiences should be exciting opportunity for any professional interested in education and public outreach.

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