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SCI-FI, STORYTELLING, AND NEW MEDIA LITERACY
Introduction
Understanding how to better engage young students in science, technology, engineering, and math (STEM) is essential. The constraints of U.S. K–12 schools (e.g., insufficient institutional supports, lack of technology access, testing pressures, etc.) often make it difficult to create truly engaging STEM curricula with which students can deeply identify (Edwards, Subramaniam, Ryu, and Oxley 2012). Educators currently have a unique opportunity to leverage resources that resonate with young people today, such as: science fiction, sci-fi movies, and sci-fi games (Moyer, Donaldson, and Wilson 2010); popular science media such as National Geographic and Discovery Education (Roche 2010); and online communities and social-media platforms (Ito et al. 2010). This is a prime time for school library programs to link these forms of media and technology to science learning.

We contend that school library programs are uniquely suited to lead innovative thinking about how to leverage these resources to help young people see the value of STEM in their everyday lives (Subramaniam, Ahn, Fleischmann, and Druin 2012). For school library programs to function as bridges to these resources, many substantive questions must be addressed. How could school libraries structure educational programs, access to media resources, and curriculum to create engaging learning experiences for students? What would be the role of the school librarian in designing and implementing STEM-infused programs? To begin answering these questions, we report here on the Sci-Dentity project launched in January 2012 <http://scidentity.umd.edu>. Sci-Dentity is a project through which researchers at the University of Maryland are collaborating with school librarians to design ways to incorporate science storytelling, new-media literacies, and participatory culture to ignite students’ interest in STEM.

The Sci-Dentity Project
Our team of school library researchers and learning scientists from the University of Maryland are collaborating with school librarians in four public middle schools, located in a large U.S. city, to develop and supervise a free afterschool program for underserved young adults (ages eleven through fourteen). We are designing a program that encourages reading of science fiction, popular fiction, and graphic novels, watching sci-fi movies, and playing science-infused games. We encourage middle school students in the program to imagine the underlying science that inspires these popular forms of media, guide students to create their own science-inspired stories, and encourage them to write and share these stories in social media. The project’s researchers contend that the stories of our lives inspire the interests we pursue and what we aspire to be in the future. For example, prior research has found that NASA scientists were often inspired by stories such as Star Wars as they pursued their interest in science (Fleischmann and Templeton 2008).

The Sci-Dentity program is codesigned by the project team and partner school librarians who create and revise session-plan prototypes for the afterschool sessions (see Figure 1). The school librarians also assist the researchers in designing the features of the social-media site that can facilitate creative science storytelling activities among these young adults. Also, after each session, librarians and the team reflect and debrief to...
guide the development of future lessons. Through formal and informal guided brainstorming with school librarians, the team leverages the librarians’ insights, as well as the resources and media available in the school library. The team experiments with various strategies to help these underserved young adults link science to their interests and experiences.

We have engaged these young adults in various activities that provide avenues for imagining themselves in the role of scientists. For example, in one of the afterschool sessions, young adults imagine themselves as creators and scientists by discussing the importance of science innovation and articulating the design of technologies. The young adults watched a short movie about storm-chasers, discussed the reasons why storm-chasers are involved in such endeavors, and identified the technologies used in such activities. We stimulate their thinking about scientific concepts by asking them to write stories of themselves as storm-chasers and to include the activities that they would perform and the technologies that they would use. Here, we share an excerpt of a story where a young adult identifies as a storm-chaser:

I am a storm chaser and I just got a call from my team back at the station. My partners told me that there is a huge tornado surfacing in the Maryland and District of Columbia area. My partner Mark and I quickly responded so that we could get as much information about the “funnel cloud” as we could.

Role of Participatory Culture in Sci-Dentity

The students who participate in Sci-Dentity have numerous opportunities to use new-media literacy skills and explore participatory culture. We work from Jenkins’s notions of the literacy skills that are important in participatory communities; among these skills are play, performance, appropriation, judgment, transmedia navigation, networking, and negotiation (Jenkins 2006). We have found that the school library setting is ideal for the Sci-Dentity program because the environment enables young people to express these literacy skills. In Sci-Dentity students are encouraged to play with their imaginations as they create new narratives that weave science knowledge into their ideas for stories. A major focus of our research is striving to understand how to provide opportunities for young people to perform, which Jenkins defines as the ability to adopt different identities for the purpose of discovery. Many of the stories created by our students involve themselves as characters, or are inspired by friends, family, and other individuals in their lives.
As young adults participate in Sci-Dentity, they acquire the literacy skills as elaborated by Jenkins; these skills align with the common beliefs and learning outcomes outlined in AASL’s Standards for the 21st-Century Learner. The Standards for the 21st-Century Learner include four standards that students must achieve: “(1) Inquire, think critically, and gain knowledge; (2) Draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge; (3) Share knowledge and participate ethically and productively as members of learning communities.”

In addition, the online community we are creating <sci-dentity.org> (see Figure 3) provides social-networking features such as personal profiles, which we hope will enable our young students to express themselves and develop their identities over time. Besides developing their online personas and networking at the sci-dentity.org site, the young adults in our program also have opportunities to practice information appropriation skills. One feature of the online community is the ability to remix stories from others in the social network. Our initial work with this feature has led us to explore deep issues of appropriation with the youths, such as: “Who gets credit for creative work?” “What is copying versus remix?” “How should remix be designed into technology tools?”

We intentionally involve a variety of media and interaction with information sources in our curriculum. As noted earlier, students may watch online videos about storm chasers, read comic books about mutant super-powers, find science facts via apps on an iPad, and integrate these sources into their sci-fi stories. To deeply engage with this type of learning experience, skills of transmedia navigation, judgment of information sources, and negotiation of different media forms are vital for students—and the school librarians play an important role in facilitating the learning of such skills.

**Incorporation of AASL Standards and Dispositions**

All common beliefs articulated in AASL’s Standards for the 21st-Century Learner (AASL 2007) serve as the foundation for Sci-Dentity. Of all the beliefs, the belief that learning has a social context—and is enhanced by opportunities to share and learn from others—is the backbone of the Sci-Dentity project. Emphasis on other beliefs—the importance of developing multiple literacies, reading as a window to the world, inquiry as a framework for learning, the importance of teaching ethical use of information, and technology skills’ important role in future employment—are also evident in Sci-Dentity, as demonstrated by the above examples of afterschool-session activities and stories that these young adults have written.
of our democratic society; and

(4) Pursue personal and aesthetic growth” (AASL 2007, 3).

As these young adults play and perform, they must inquire about the science knowledge that they would like to include, think critically about how to weave the science knowledge or fact into the story and gain knowledge about characters, contribution of each character to the story, and the role of science in their stories (standard 1). The interaction between the science facts and imagination, the ability to execute transmedia navigation, judgment of information sources, and negotiation of different media forms will allow these young adults to make informed decisions about their storyline, apply scientific knowledge to their stories and create innovative stories (standard 2). Through constant conscious practice of information appropriation obtained from STEM-infused resources and through consultation with their peers—whether to remix, how much to remix, and how to remix—young adults are learning how to share knowledge and participate ethically in the Sci-Dentity social–media site (standard 3). The learning of all these skills will contribute to the personal and aesthetic growth of these young adults as scientists and creators (standard 4).

A participatory culture such as the one facilitated by Sci-Dentity enables these young adults to acquire many dispositions in line with the AASL standards. Dispositions such as creativity, adaptability, practice of divergent and convergent thinking, social responsibility, teamwork, openness to new ideas, curiosity, and appreciation of literature are instilled and encouraged in Sci-Dentity.

Conclusion
In this project participatory culture is more than a buzzword. We found that new-media literacy skills are extremely important for young adults to fully engage with learning and deeply integrate new ideas about science into their own thinking. These new-media literacies are infused in the Standards for the 21st-Century Learner, and, in most schools, school librarians are the educators trained to facilitate the learning of these new literacies. To create and sustain a participatory community such as Sci-Dentity, we encourage schools to leverage the five roles (AASL 2009, 16–18) and the expertise that school librarians offer:

- The teacher role (facilitating the learning of these new-media literacies)
- The information specialist role (facilitating the provision and acquisition of science-infused resources)
- The program administrator role (managing a science-infused afterschool program that provides opportunities to leverage resources that resonate with young people)
- The instructional partner role (making cross-curricular connections to science and other subject areas)
- Leader (making the school library a place to advance students’ interest in STEM and learning STEM)

We strongly believe that the school library program is best equipped to facilitate programs such as Sci-Dentity at each school. Sci-Dentity provides an effective venue for school librarians to facilitate students’ acquiring the skills and developing the dispositions in AASL’s Standards for the 21st-Century Learner, and using these skills and dispositions to learn about STEM and envision STEM careers for themselves.

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Works Cited


