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# Standards Column -- Augmented Reality: An Opportunity for Content Creators to Extend their Reach

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# Standards Column — Augmented Reality: An Opportunity for Content Creators to Extend their Reach

by **Todd Carpenter** (Managing Director, NISO, One North Charles Street, Suite 1905, Baltimore, MD 21201; Phone: 301-654-2512; Fax: 410-685-5278) <[tcarpenter@niso.org](mailto:tcarpenter@niso.org)> [www.niso.org](http://www.niso.org)

Twice in the past six weeks, I have had the pleasure of hearing **Levar Burton** speak. After years of having watched him play Lt. Geordi La Forge in *Star Trek: The Next Generation*, it is easy while listening to him for one's mind to drift off to the most extreme examples of Augmented Reality (AR). Science fiction has given us plenty of fanciful examples of how augmented or artificial reality might develop in the distant future — whether it is the holodecks of *Star Trek*, the computer interactions in *Minority Report*, or the fully electronically-mediated world that is the premise of the *Matrix* movies.

Augmented reality in our world today is simultaneously less fanciful and amazing. But it is more ubiquitous, more useful, and can be more awe-inspiring than one might think. It is also an area that publishers could leverage for their content to provide their information to users at exactly the time they need it most.

Augmented reality has a variety of forms and applications. I prefer the following Wikipedia definition of AR: “A live, direct or indirect, view of a physical, real-world environment whose elements are augmented by computer-generated sensory input such as sound, video, graphics, or GPS data.”

There are a number of everyday examples of Augmented Reality that we do not normally think of in that context. Almost every modern sporting event on television includes some form of AR overlay. These include the first-down marker lines that appear on the field during football broadcasts, to the streaking blue hockey puck during some NHL games, to the players' names and information that follows them as they move around the field during some soccer games. These are all computer-mediated overlay of information on what we perceive as “reality” through a screen of some sort. There are many, many more potential applications for AR in fields as diverse as architecture, industrial design, military, and emergency management.

A new class of smart phone applications that incorporates GPS functionality, a camera, and a range of Web data stores has already expanded the use of AR in the average user's life. Applications created for historical information, commercial advertising, traffic information distribution, advertising, and even guided tours can combine geo-location data, image capture, and semantically coded data to provide an augmented reality experience.

A number of AR-based tools are already available and in use. One example of an AR application is the very popular Star Chart, which matches your location, the cur-

rent date and time, and the orientation of the device to provide a chart of the visible stars in the sky.

The Argon Browser (<http://argon.gatech.edu/>) is another example of an application taking advantage of AR functionality. Argon is an open source tool for the iPhone that was developed by **GVU Center at Georgia Tech**. It uses a mix of Keyhole Markup Language (KML) for geographic annotation and HTML/JavaScript/CSS to generate applications in which any properly-formatted Web content (with appropriate metadata) can be converted into AR content for display. I have tried Argon, but the dearth of properly-tagged content makes the tool an interesting prototype that isn't quite functional at the moment.

There were two other examples of interesting AR applications developed by the library and museum communities that were discussed during the IMLS WebWise conference in March. The first was the TAP and TourML toolkit (<http://www.tapintomuseums.org/>). TAP is a system for building applications to view museum exhibits that utilizes TourML, a mark-up language designed specifically for museum tours. With these tools, non-technical museum staff can build interactive AR tours. The other interesting AR project at WebWise was “WolfWalk” (<http://www.lib.ncsu.edu/dli/projects/wolfwalk/>), an application that provides users a geo-enhanced opportunity to view historical information about the **North Carolina State University** while walking about the campus.

While much of the AR that is currently being developed has to do with geo-location, there are a variety of ways in which information can be made context-sensitive. Providing information interactively and in the context in which a reader needs it is the ultimate use case for most reference works. Some electronic textbooks are beginning to provide context-sensitive learning experiences. One could envision expanding this to textbooks that allow students to actually experience something rather than just reading about it. A potential example of this type of experience was created by GE to promote their SmartGrid ([http://ge.ecomagination.com/smartgrid/#/augmented\\_reality](http://ge.ecomagination.com/smartgrid/#/augmented_reality)). Much like the museum tour applications, a travel guide could let you virtually walk the streets of Paris. Or imagine a world where image pattern matching becomes good enough to match images with CAD drawings or schematics.

The technology underpinning these efforts is developing rapidly. A research team at **Adobe** displayed work

on 3D pattern matching last year at an ICSTI meeting, illustrating how a complex 3D object in science, engineering, or medicine could be dynamically and interactively displayed. If this could be done in real-time with context-sensitive information, say of a photo of the object in question, this could be an exceptionally powerful AR application. The rapid technology enhancements in mobile and tablet devices, with a variety of input structures like cameras, accelerometers, and GPS chips provide the infrastructure that AR needs. The one critical missing element is AR informational markup providing the context.

Publishers should begin to consider how their content might be integrated with these technologies to provide entirely new types of learning and experiences. While the recent rise of the App ecosystem has shown us one path forward, in all likelihood this model is not sustainable for most publishers in the long-term. Designing a customized software interface for each publisher, and for most content providers in our community, is impractical in the extreme and the relatively modest market size makes such tool development an unprofitable exercise.

So how can publishers take advantage of this new reality? A publisher might license its content to other developers. There are few good business model examples for this, such as the financial press licensing data streams. We will need some considered thought, however, about how one can and should license content in such a way to make the product offering valuable both for the user as well as the content creator.

The possibilities of augmented reality reinforce the need for publishers to create content in a structured and semantically-enriched way. Recall my experience with the Argon browser that had some great functionality but not enough formatted content to make it worth using (yet). If publishers would invest more energy at the outset in structuring content in machine-understandable formats such as in XML, more opportunities could open up to use the content in ways not initially envisioned. Proprietary formats and custom-built implementations are not only costly, they also limit the ability to integrate the content into third-party or user-generated applications. Using standard, structured data models such as the Journal Archiving Tag Suite or common book models like SCORM or DITA (just to mention a few, there are many others) will allow the initial investment in formatting to pay off in the ability to re-use and “mash up” the content.

Another avenue content creators can pursue right now to prepare for AR is to monitor the work being undertaken by the Augmented Reality community and some of the context-re-

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lated tagging structures that are being developed. The W3C launched an Augmented Reality Community Group last summer to delve into these issues. That group is focused on a combination of hardware sensors, open APIs, and principles of the Open Web Platform. Whether a Web-based model makes the most sense is an open question, but it is not an inappropriate place to start. This is similar in principle to the rationale behind EPUB 3 being based upon HTML5 and CSS 3. In all likelihood, the majority of the publishing community will not be leading these initiatives, but rather reacting to trends in the tech marketplace. However, agile publishers monitoring this work could engage in shaping the work, planning for its integration in information delivery, and be ahead of the curve.

There are skills that the publishing and information distribution communities could bring to bear on AR. In particular, the focus on discovery of information and facilitating its discovery through metadata, ontologies, and other forms of discovery services is an area where libraries have long been the experts. Another important area of leadership and expertise that the publishing and library communities have is in ensuring that content in these new forms is accessible to people with disabilities, archivable, and migratable from one technology platform to the next. In part, this ties back to the point about creating well-structured content. But it goes deeper to an understanding of the need to be “interoperable with the future,” as **Evan Owens** frequently emphasized when he was managing the **Portico** preservation systems.

The world of augmented reality isn't that far away for many publishers. Being able to operate, succeed, and contribute to that developing environment should be a welcome opportunity for many publishers. Knowing what is coming and how to incorporate it into existing and future content will be key to succeeding. Learning from lessons gained in electronic publishing could position current online publishers ahead of other content creators who are still inching their way out of the print world. 🌱

## Back Talk

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ies for students: repurposed libraries to include learning commons services and layout; more eBooks; selecting the best of the Web to match course needs; digitizing valuable special collections materials; self-check circulation; user-initiated ILL and purchasing programs; making information and services easier to use anywhere, anytime by putting them in the cloud; hiring more staff for online services; developing mobile device content and services; and providing library social networking services.

There are also a number of trends which are not especially student-centered or designed to make library content and services more convenient to use: sharing specialist staff positions with other institutions; closing down reference collections; collaborating with other programs on campus which are more research than student focused; support for institutional repositories; helping faculty with intellectual property issues; switching from AACR@ to RDA for cataloging; outsourcing as much technical processing as possible; mainstreaming special collections processing; and librarian hand-wringing over its loss of its role as the guardian of the academy's intellectual output. It isn't that following these trends won't have value, but they are not likely to readily receive user support — they run the risk of being seen as more examples of librarians fussing about things important to them but not to the university's teaching and learning goals.

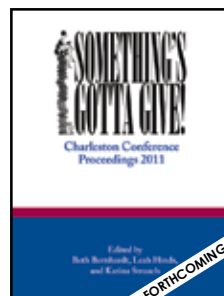
Well, I am sure I will have a great time in Taiwan eating wonderful food and seeing delightful sights, but I am not sure all of these global [read Western] trends will be received with great enthusiasm. Yet, if they want to be seen as “with it” libraries, they may still have to adopt them to play globally. 🌱

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