Innovation Mashups: Academic Rigor Meets Social Networking Buzz

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Exploring new options for publishing and content delivery offers an enormous opportunity to improve the state of the art and further modernize academic and professional publications.

Traditional organizations such as the IEEE Computer Society, ACM, and Usenix have been encountering increasing competition from new ways of rapid publishing and dissemination, including social networking sites (Facebook, Twitter, LinkedIn, Google+), blogs with enabled commenting, video posting (YouTube), Slashdot, and many other types of media. "Liking" is replacing traditional impact factors, comments left on authors' webpages or blogs are replacing formal reviews, and site visits have more relevance than the number of article citations.

RESEARCH TOOLS

Websites are increasingly providing tools directed to the academic research community's needs. In addition to assisting in research for academic papers and patents, they also offer social network features such as following authors and topics. Examples of these websites include the following:

- Microsoft's Academic Search (http://academic.research.microsoft.com) provides visualization tools for use in creating graphs that show the "academic distance" between researchers and illustrate the relationships between coauthors or citations. It also features a call for participation calendar.
- A Google Scholar (http://scholar.google.com) Web search not only returns links to a paper but also to other papers that cite it. In addition, the "My Citations" tool graphs citation statistics for individual researchers over time.
- Thomson Reuter's ResearcherID (www.researcherid.com/home.action) asks researchers to associate all appropriate papers with their unique identifier to eliminate author misidentification.
- Apple's iTunes U iPad app (http://itunes.apple.com/us/app/itunes-u/id490217893?mt=8) presents course material such as lectures, notes, and slides in a handy notebook format that allows note taking.

The speed of content delivery has changed from taking months to days, and updates now take seconds instead of minutes. The unanswered questions concern whether the rigorous review of academic papers will survive this technology disruption and whether students will replace books with Wikipedia and Google searches.

EXPLORING OPTIONS

At the IEEE Computer Society (IEEE-CS), we've been exploring new ways of publishing and content delivery for decades. We've been challenged at the intersection of financial sustainability and IT innovation to improve the state of the art by offering rigorously reviewed publications through modern means of content delivery.

The future offers an enormous opportunity to further modernize academic and professional publications. Our goal is to meet customer (readers, authors, members) expectations driven

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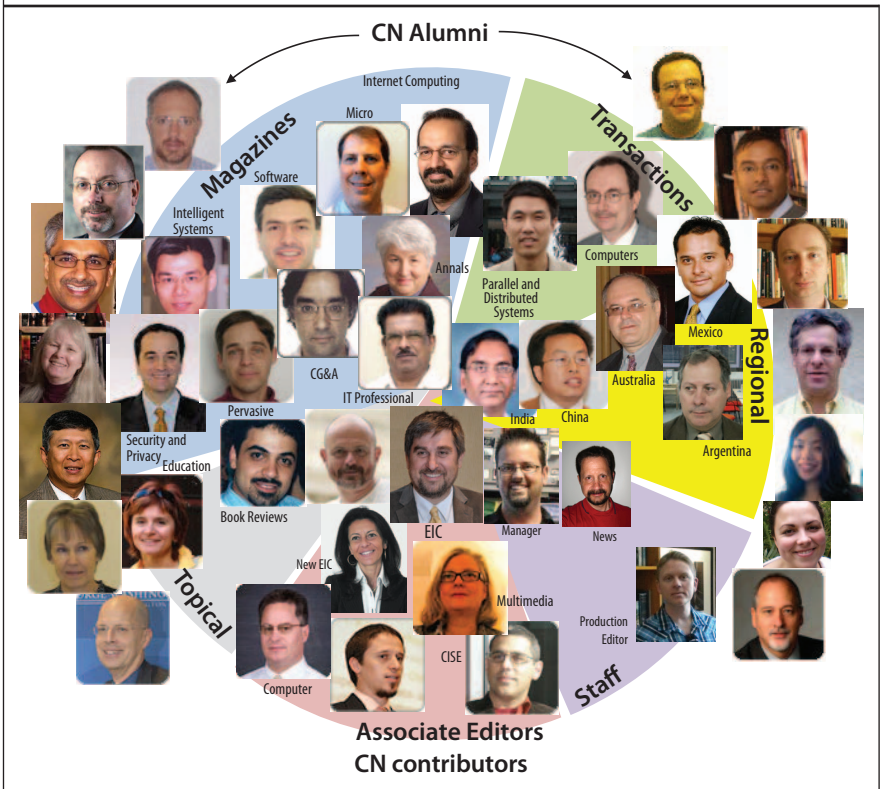

Figure 1. Computing Now: A mashup of expertise across magazines, transactions, regions, and topics.

by their online experiences, including offering opportunities to provide comments, reviews, and cross-references.

These efforts will require capturing new data from our customers and from diverse sources—not just at the point of sale. We've gained insight by serving as editors of Computing Now (http://computingnow.computer.org)—a portal to IEEE-CS publications—during the past four years and more recently by driving the formation of the IEEE-CS's Special Technical Communities (STCs; http://stc.ieee.net). Based on our collective experience, we share here our views of the Society's future in what we call innovation mashups.

HISTORIC PERSPECTIVE

The IEEE-CS has made at least four attempts to develop online publications that improve content delivery and increase new technology use while remaining financially sustainable as online-only endeavors. The most recent attempt was *IEEE Distributed Systems Online*, the first successful IEEE-CS online-only magazine that contributed to new ways of publishing.

Driven primarily by volunteers with help from staff, DSO enriched traditional manuscripts with video and audio interviews and other multimedia products. However, despite quality contributions and wide recognition, DSO wasn't financially sustainable. The original vision of generating online revenue through advertisements required substantially higher subscription rates than professional or academic online magazines could generate. DSO had thousands of monthly views, as opposed to the hundreds of thousands needed.

We also discovered that significant IT support was required for efficient and effective online publications that offer easy content posting, the ability to view analytics of individual parts of the publications' homepages, convenient posting of free and expiring content, and a tagging and filtering infrastructure. Today, most of this functionality is routinely supported by public domain portals and content management frameworks such as WordPress or Joomla, products such as Liferay, or online services such as Google Sites. However, 10 to 15 years ago, this technology was still a novelty, and introducing it across the IEEE-CS required substantial financial, technical, and human resources. Insufficient IT support affected the marketing aspects as well.

Ultimately, exceptional volunteer efforts and heroic staff contributions were trumped by the lack of both concerted marketing and business contributions and critical IT support. Nevertheless, two distinct products evolved from the experiences learned: Computing Now and STCs.

COMPUTING NOW

After Computing Now was launched approximately five years ago (http://computingnow.computer.org), its status was subsequently formalized with the appointment of an editor in chief. However, as Figure 1 demonstrates, CN was never meant to be a formal publication, offering instead a mashup of existing IEEE-CS publications, specifically magazines. CN's content initially was generated by the individuals who filtered it from their publications, and over time, it expanded to cover transactions and conferences as well as IEEE-CS regional chapters. Now, CN is in many ways a mashup by design.

As Figure 2 shows, CN's page views have increased over time from a few thousand to many tens of thousand. This effectively reversed the trend demonstrating a general decline in printed publications. Interesting phenomena include cycles that reflect a season-related readership decline (summer) or increase (typically fall—specifically, September), high-quality monthly content, or receiving men-

tion on a popular social networking site such as reddit.

CN's initial goal was to deliver thought-provoking, newsworthy technology snippets to the broad IEEE-CS audience. Another goal was to modernize magazines and help them catch up with technology.

Each month, CN offers a theme centered on a specific technical area, introduced by an expert in the field, and accompanied by four to six key articles published in various IEEE-CS magazines, journals, and conferences. CN focuses on delivering a substantial variety of multimedia content, including interviews, extended reports accompanying published papers, and technology news reports.

CN has also developed experimental strategies to utilize social networks such as LinkedIn, Facebook, Twitter, and Google+ to offer mashups of news, online newsletters, and so on. Additionally, it has explored different means for content delivery via tablets and smartphones.

In the course of this process, we realized that we had to roll up our own sleeves and deliver innovation. Thus, we formed CN Labs (www.computer.org/portal/web/computingnow/cnlabs), which resulted in new CN delivery applications for the Android, Apple, and iGoogle platforms, as well as Twitter feeds that aggregate CN content and IEEE-CS pages.

Although CN has yet to become financially sustainable, it has justified the need for a strong marketing department, and we are enthusiastic about forthcoming innovative approaches in this area.

SPECIAL TECHNICAL COMMUNITIES

Communities are at the heart of most IEEE-CS activities, including editorial boards, technical committees, conference program and steering committees, and groups defining standards, education curricula, and professional bodies of knowledge. This cross-pollination motivated the establishment of STCs (D. Milojicic and P. Laplante, "Special Technical Communities," *Computer*, June 2011, pp. 84-88). We started with six pilot STCs, which quickly increased to 14. We then divided the STCs into two categories: grass roots (social networking, sustainable computing, and cloud testbeds) and strategic (cloud computing, life sciences, and smart grid). While the community tied to a particular topic primarily runs and maintains the grass-roots STCs, the IEEE-CS president oversees the strategic STCs. Figure 3 depicts the mapping of existing STCs using the conceptual 3D diagram that served as a basis when initiating these efforts.

Similar to CN, STC leaders are investing their professional experience to drive the concept forward. For example, we've developed scripts for counting the members in social networks, we're working on Google site templates for IEEE-CS websites, and we're developing forms for subscriptions to individual STCs. We're endeavoring to minimize staff utilization to support these efforts, retaining at the metalevel while maintaining commonality across STCs.

STCs have become one of five core IEEE-CS strategies, bringing our vision closer to reality. The STC concept remains faithful to its mission to form technical communities in a specific field of professional interest, but we are increasingly doing it using cutting-edge technologies.

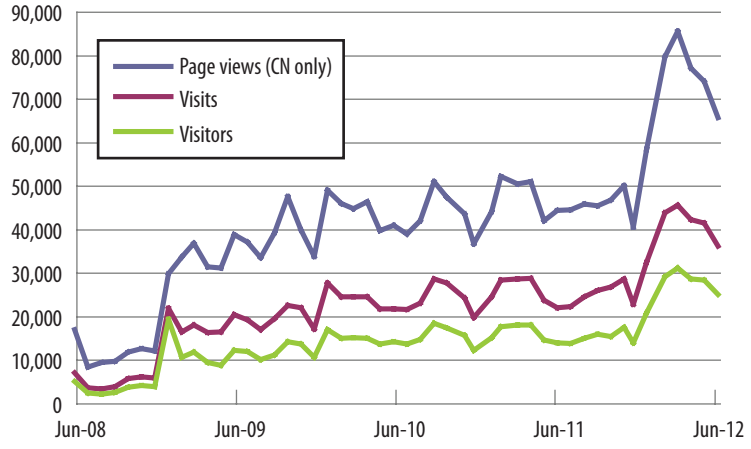

Figure 2. Growth in CN distribution (visitors, visits, page views), 2008-2012.

LESSONS LEARNED AND FUTURE WORK

To remain relevant, modern societies must adapt to social and technological changes in the world. The recent changes are dramatic, and they reflect on every aspect of private and professional life, which our efforts continue to blend.

The lessons we've learned so far include the following:

- *Bring value by focusing on specific information.* People are suffering from information overload. Both CN and STCs offer mashups of existing knowledge sources to filter information so members can consume only what's relevant to them.
- *Leverage the expertise of professional IEEE-CS members for the benefit of society.* Both CN and STC volunteers have introduced technical advancements in content delivery and management, using their expertise to provide scripts for membership management and templates for STC sites.
- *Just do it.* From the beginning of both efforts, we've adopted the perpetual beta model, continu-

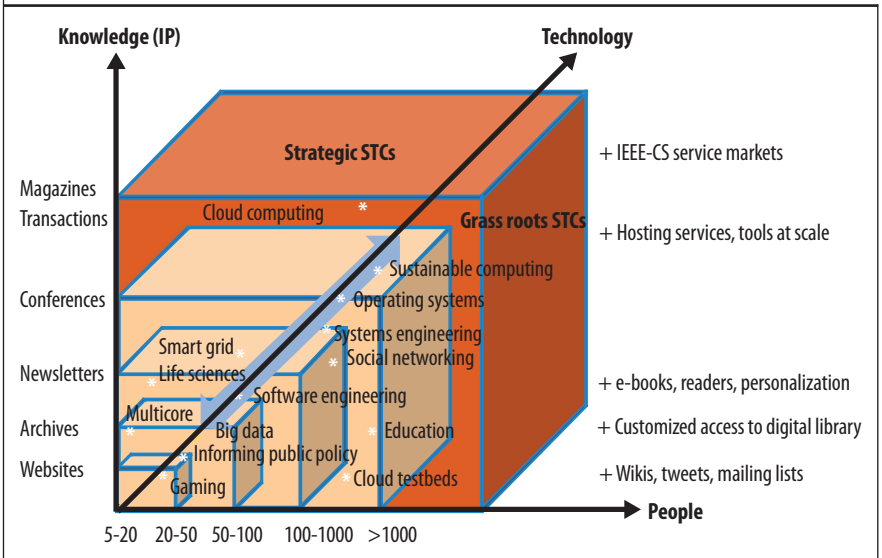

Figure 3. STC progress: 14 STCs positioned in the knowledge/technology/people space.

ing to experiment and try new things and evaluating them as they evolve. In contrast to long planning sessions and endless debates, the "just do it" approach substantially decreases time to adoption.

- *Focus on new customer requirements*. Key concepts include gather customer data from touch points beyond the point of sale and download metrics to drive new features; use social media to increase participation by the community, authors, and editors; learn from comments, tags, and reviews; develop new content—multimedia sidebars, introductions, summaries; and introduce new search options through groups, author clusters, and organizations.
- *Embrace new challenges*. Open access is being adopted, but business models are still evolving; copyright is still being explored in the complex world of social networking and multimedia, including Web linkage implications; and delivery touch points evolve with new types of devices and UIs, presenting many challenges to new application development.
- *Ultimately, it's all about people*. We're all extremely busy professionals. If we don't find personal satisfaction in what we do, we'll stop doing it. We manage both CN and STCs loosely but continuously, primarily through rigorously timed weekly 30-minute meetings. This approach has proved to be very efficient, leveraging the allocated time to bootstrap and drive innovation throughout the IEEE-CS.

The opportunities for improvement in both CN and STCs are limitless. Among many other things, we plan to

- enhance traditional editorial calendars with frequent real-time updates like the social-savvy world, including building a large blogging network—content is king!
- let our users, readers, and members create their own channels of interest—context is queen!
- provide device-independent access and offer multimedia content within articles in IEEE-CS scientific publications, including links to code, videos of demos, and simulations;
- increase interactivity between authors and readers through blogs and social networks; and
- attract the graduates of our field to join and volunteer their efforts virally, similar to tech sites such as cnet, TechCrunch, Ars Technica, and Engadget.

Our intent in sharing the lessons we've learned is to contribute to the advancement of similar efforts by the IEEE-CS and other IEEE societies. C

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COMPUTER SOCIETY OF INDIA JOINS THE IEEE COMPUTER SOCIETY'S NEW SISTER SOCIETY ASSOCIATE PROGRAM

The Computer Society of India has become the first organization to sign up for the IEEE Computer Society's new Sister Society Associate Program, an initiative intended to encourage the global exchange and dissemination of technical information in support of the computing technology field.

Under the agreement, the two organizations will share technical articles on computing, cooperate on conferences held in India, and leverage associations between the organizations' elected officers. Computer Society of India members who join the Sister Society Associate program will receive digital issues of three IEEE-CS magazines, as well as discounts on certification exams, training courses, and subscriptions to other magazines.

The partnership is intended to encourage the exchange and dissemination of technical information and to promote understanding and cooperation between the members of the Computer Society of India and the IEEE-CS. The agreement contains provisions for computing professionals and students in India to become involved in both organizations.

Earlier this year, the IEEE-CS signed a cooperative agreement with the Advanced Computing & Communications Society, an organization for IT professionals in India, to share technical information and work together in a variety of ways.

Through its Chennai, India-based Registered Education Provider, Purna Career Solutions, IEEE-CS education and training products are offered at a variety of Indian educational institutions. The IEEE-CS offers two certification programs: Certified Software Development Associate for entry-level developers and Certified Software Development Professional for midlevel workers. IEEE also operates an office in Bangalore, India.