UC Davis

UC Davis Previously Published Works

Title

Afterword: Beyond management: Understanding the many forces that shape content today

Permalink

https://escholarship.org/uc/item/50r3t0w5

Authors

Evia, C

Andersen, R

Publication Date

2020-02-24

Copyright Information

This work is made available under the terms of a Creative Commons Attribution-NoDerivatives License, available at https://creativecommons.org/licenses/by-nd/4.0/

eScholarship.org Powered by the California Digital Library
University of California

AFTERWORD: BEYOND MANAGEMENT

Understanding the Many Forces that Shape Content Today

Carlos Evia

VIRGINIA TECH

Rebekka Andersen

UNIVERSITY OF CALIFORNIA, DAVIS

Chapter Takeaways

- Technical communication educators need to embrace content management as a core disciplinary competency.
- The term "content management" is a small umbrella to cover all content-related work. The field of technical communication should move beyond talking about content management to talking about content operations and the disciplines of content.
- Structured authoring is key to modern publication workflows and practices. Academia can no longer afford not to talk about structured content.
- Ongoing collaboration between academic programs and industry partners is essential to prepare future technical communication professionals for success in a Content 4.0 world and beyond.

Keeping abreast of trends in the content profession is something that we both try to do as much as possible. We attend at least one industry conference a year, such as the Center for Information-Development Management (CIDM) Best Practices Conference or the Society for Technical Communication (STC) Summit; regularly listen to podcasts; watch webinars; engage with influential practitioners in blogs and social media; and read trade publications. Carlos, in his role as Co-Chair of the Lightweight DITA (Darwin Information Typing Architecture) Subcommittee and member of the DITA Technical Committee at the Organization for the

Advancement of Structured Information Standards (OASIS), also engages in frequent conversations with committee members regarding standards development and implementation approaches. And Rebekka, as an academic member of the CIDM Advisory Council, hosts annual conference calls with CIDM members to learn about what their organizations are doing well and what challenges they are facing.

We have, in different ways, strived to shape our field's understanding of and approach to teaching content management—Carlos through his standards-development work (Evia, Eberlein, & Houser, 2018; Evia, 2019) and course innovations (Evia, Sharp, & Pérez-Quiñones, 2015; Evia & Priestley, 2016) and Rebekka through her comprehensive reviews of the trade and scholarly literature (Andersen & Batova, 2015; Batova & Andersen, 2017) and articulations of content strategy practices in industry (Andersen, 2014). But keeping abreast of trends—and, more importantly, making sense of what they mean for educating future technical communicators—is proving to be an increasingly difficult task.

As chapters in this collection show, many technical communication academics are in a non-stop game of trying to catch up with industry practices related to content. Whereas some have apparently thrown in the towel (Kimball, 2016, for example, suggests that we turn our focus away from preparing "strategic" to preparing "tactical" technical communicators), others have tried to keep up and adapt curricular approaches (e.g., Batova, 2018; Duin & Tham, 2018). One would think that the number of academics who keep a finger on the pulse of the content industry would be on the rise, but the opposite seems to be true (as evidenced by the near absence of any recent published research focused on content activities in organizations). A key reason for this, we think, is that talking about content in technical communication is complicated, and continues to get more complicated.

Take, for example, the concept of Content 4.0, which Joe Gollner (2016a) introduced at the 2016 CIDM Best Practices Conference in his talk "Are You Ready for Content 4.0? The Shape of Things to Come and How to Prepare for It." Gollner, known in the content industry for always being a step ahead of what is to come, compared the four evolutions of industrial innovation to what he saw as the four evolutions of content. Given changes in industry practices, from labor divisions and mechanization (Industry 1.0) to automation of manufacturing tasks and smart parts (Industry 4.0), Gollner suggested that a parallel evolution of content innovation was inevitable (Figure 12.1 depicts this evolution). Whereas traditional publishing characterized Content 1.0, when content and format were intertwined, single-source publishing characterized Content 2.0, when content and format were separated; Gollner noted that, as of 2016, much of the focus of the content industry had been directed at Content 2.0. However, Content 3.0, which Gollner called *Integrated Content*, was what a majority of the leaders and innovators in the room were trying to figure out how to do well; the goal being for content contributors (e.g., marketing, training, technical publications) to share rules governing structure and semantics in such a way

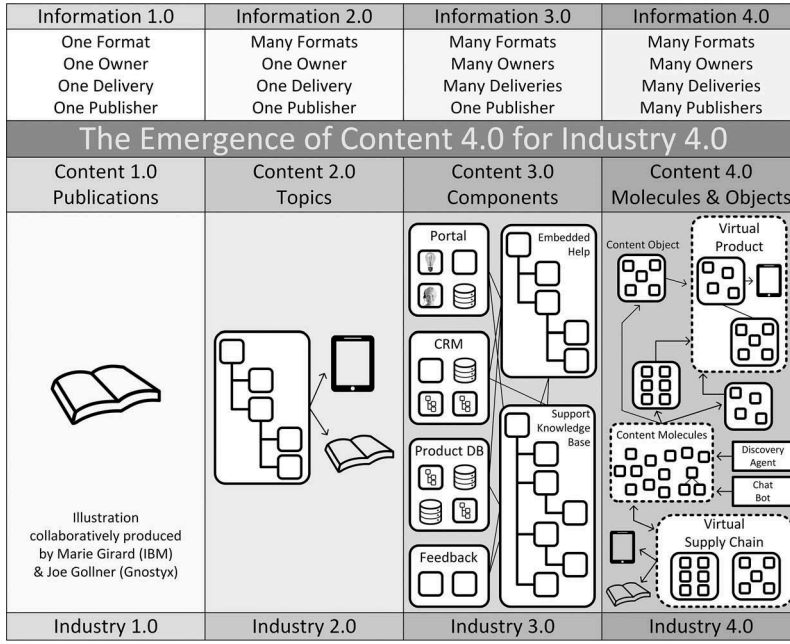

FIGURE 12.1 The emergence of Content 4.0 for Industry 1.0. In moving from Content 1.0 to Content 4.0, "the focus of communicators shifts from the publications themselves towards progressively smaller and smarter content components" and "there is a greater and greater awareness of, and interaction with, the various applications that govern either where the content sources hail from or where the content assets will go as part of their publication and delivery" (Gollner, 2016b).
Image produced by Marie Girard and Joe Gollner and used with permission

to allow for content integration and an increased focus on the customer or user experience journey.

Gollner then introduced Content 4.0, which he saw as the next stage of content innovation. Content 4.0, he suggested, would be all about smart content, or "content that assembles, transforms, and renders, dynamically in response to contexts and agent needs." In this evolution of content, the modular content object becomes the book or document of the Content 1.0 world:

> content is planned, designed, created, managed, and exchanged as objects that incorporate … the associated rules governing the structure and meaning of the content and an array of rendition and behaviour processes that the object can use to render that material independently or in concert with other content objects.
>
> *(Gollner, 2016b)*

In a Content 4.0 world, "content becomes much more precise, content design becomes one part in a total system, content creation becomes more technical, and content management becomes more complex."

Rebekka, feeling in great need of Ibuprofen, was not the only one in the room at that moment staring perplexedly at Gollner, who looked apologetic. Technical communication had just entered the world of science fiction and, at least for those in the room who were not engineers and computer scientists, the path forward seemed daunting, if not impossible. Anticipating feelings of defeat, Gollner in his usual witty style projected an image of a face plant, then moved to assure those in the room that they were "headed in the right direction" and that "the burden of complexity can be shared" and "managed within engineered systems."

A few years earlier, at the same conference, the leaders and innovators in the room were talking about integrated content strategy as a concept. At that time, many companies had successfully adopted a single-source publishing model and were looking to further innovate. By 2017, many of the companies looking to implement an integrated content strategy had successfully done so (as evidenced by the number of success stories presented at the 2017 CIDM Best Practices Conference). A review of trending podcasts, webinars, blogs, and conference agendas now shows the content industry intently focused on the affordances of smart content, designed and engineered to interact with chatbots, voice assistants, and intelligent machines and to populate PDFs, online help, mobile, video, and other content delivery channels.

Recently, *content engineering* has emerged as a fully fledged discipline focused on the technical aspects of smart content publishing workflows, while the discipline of *content strategy* has matured in its focus on planning and measuring content assets and their impact on publications. Carlos tries to stay connected to the professional conversation on these emerging disciplines, and his assessment is that they are intrinsically connected to *content management* but each one has a unique edge. As we will describe later in this afterword, the combination of disciplines related to the planning, management, delivery, and assessment of technical content is a complex meeting of forces that cannot be grouped under the umbrella term of "content management" anymore.

When Tracy asked if we would be willing to contribute to this edited collection with an afterword that addressed the question "Where do we go from here?", we decided that we wanted to focus on the many forces shaping content today. We are presenting our overview of these forces as a way to lay some groundwork for thinking about what and how we might focus future conversations on the teaching of content management. In what follows, we describe some key forces shaping content activities in industry and make a case for why we, as educators, need to embrace content management as a core competency in technical communication. We also argue that the field needs to move beyond talking about content management to talking about content operations and the disciplines of content. Doing so would help academic

programs to specialize curricular offerings and solve problems that already exist with modern technical content operations but that require a new vocabulary to be properly defined or explained.

The Many Forces Shaping Content

In this section, we explain what we see as the four primary forces shaping content conversations and activities in industry today.

The Need to Publish to Many Channels, Many Devices (Force 1)

User demand for content accessible from any device and available in an array of formats is perhaps the most significant force shaping content conversations and activities today. Traditional document-based publishing practices are not sufficient to meet this demand, and many organizations, in efforts to modernize their approaches to developing, managing, and delivering content, have reached out to consultant agencies specializing in content strategy and engineering for help. The challenge for organizations, as self-proclaimed content evangelist Scott Abel (2017) so aptly sums up in his personal bio, is figuring out how to "deliver the right content to the right audience, anywhere, anytime, and on any device."

Smart technologies and faster, better Wi-Fi are changing how and when people access content and what they expect from that content. In 2016, for the first time, more people accessed the internet via a mobile device than a computer (StatCounter, 2016). Gartner (2016) predicts that "by 2020, 30% of web browsing sessions will be done without a screen."

To compete in this technological landscape, organizations must now have a content presence across a range of channels and devices. And these devices do not just include computers, tablets, and smartphones. They include voice interfaces such as Alexa and Siri, smart wearables such as Apple Watch and Google Glass, and invisible interfaces. In a recent conversation with Carlos, Jack Molisani—a longtime prominent voice in the profession—had the following to say about the shape of content to come:

> We're going to get to the point where you have absolutely no idea where this content is going to be displayed. It could be displayed on a refrigerator, it could be displayed on a car dashboard—so you need to write this content so that it stands alone, can be easily found, and then dropped into whatever content ecosystem it's going to [eventually] show up in, which is so different than having to format something so that it can fit into an 8x11 page.

Results of three recent surveys of trends in technical communication reveal that PDF and HTML continue to be the most common publishing formats, with embedded user assistance and video close behind. Although fewer than

20% of organizations reported publishing to mobile applications, dynamic delivery, or chatbots, many had plans to publish to these formats in the near future. The surveys we reference here include the 2017–2018 edition of the Adobe Tech Comm Survey (2,000-plus respondents) (Singh, 2018), the 2018 Publishing Trends survey conducted by Comtech and the Data Conversion Laboratory (DCL) (340-plus respondents) (Stevens & Madison, 2018), and the 2019 State of Technical Communication survey conducted by the Content Wrangler (600-plus respondents) (Abel, 2018a). Table 12.1 presents a snapshot of the range of channels to which organizations are currently publishing content and to which organizations plan to publish content in the near future, according to the results of the three surveys.

The challenges that organizations face in preparing content for a multichannel publishing world are many. These range from the need to adopt strategies, processes, and technologies that enable the creation of highly engineered, modular content to the need to work across departmental units and teams to develop unified processes that allow for content to be effectively shared and combined in myriad ways.

In a world where people access product content from a vast array of channels and devices, that content—regardless of where or how it is accessed—needs to

TABLE 12.1 Current and Future Channels to Which Organizations Are Publishing Content

Channel	*Currently Publishing*	*Prediction for Near Future*	*Noteworthy*
PDF	75% (Comtech/DCL) 86% (Adobe)	20% decline –	PDF publishing predicted to decline
HTML	80% (Comtech/DCL) 36% (Adobe) 56% (Content Wrangler)	Same 17% increase –	HTML5 is the format choice for mobile, with 54% of Adobe respondents reporting use of HTML5 for this
Embedded User Assistance	48% (Comtech/DCL) 15% (Adobe)	4% increase 3% increase	
Mobile Apps	18% (Comtech/DCL) 16% (Adobe)	14% increase 13% increase	
Video	15% (Comtech/DCL) 66% (Content Wrangler)	8% increase 18% increase	
Dynamic Delivery	20% (Comtech/DCL)	30% increase	Dynamic delivery predicted to increase significantly
Chatbots	6% (Adobe)	22% increase	62% of Content Wrangler respondents said they would be launching chatbots within six months

communicate a consistent, coherent message. How to do this well is one of the key challenges content leaders are working to overcome today. We call this challenge Force 2, the need to provide seamless content experiences.

The Need to Provide Seamless Content Experiences (Force 2)

Not only do users increasingly expect to be able to access the content they need any time, from any device, in the format they need it (e.g., PDF, web, video), they also expect (and need) a consistent, unified message for the same type of content (e.g., product description) regardless of where or how it is accessed. When the same type of content is written in different ways and information conflicts, customers or users can easily become confused and frustrated. Thus, one of the strongest forces shaping content today is the need for organizations to provide seamless content experiences to users or consumers.

Cruce Saunders (2018), a content engineer and founder of the content services agency [A], describes this need as follows:

> Today's thriving enterprises recognize the value of content and the role it plays in the customer experience. Consumers now expect highly relevant, timely, personalized content at all touchpoints of the customer journey, on any device or interface, across any and all channels of their choosing. Organizations that successfully deliver on these expectations reap the financial rewards and become leaders in their industries, while those that do not struggle to keep up with the rapid rate of change we all see around us.
>
> *(p. 9)*

But creating seamless content experiences is a massive undertaking for any organization. Saunders, this time in an interview with Scott Abel published in *Intercom* (2018b), points to the "soup of existing content systems, structures, and standards that don't connect and communicate" (p. 22) as the biggest obstacle standing in the way. He suggests that "we have too many content authoring management and publishing systems trying to orchestrate a single customer experience with content that doesn't transit between systems, is redundant, or is otherwise overwhelmingly inefficient" (p. 26). Part of the problem is that organizations have tended to invest more in content delivery than in content production. They have been intently focused on engaging users through multiple channels, or the multichannel experience. Angus Edwardson (2019) suggests that this focus has become problematic for customers because although they can engage with content through various channels and platforms, they "still lack a seamless experience and consistent messaging across each of these channels."

The concept of omnichannel delivery has emerged in the past couple of years to help organizations think through how to orchestrate seamless content experiences. Whereas multichannel is focused on the processes and technologies for

delivering content across an array of channels and devices, omnichannel is focused on coordinating activities across departmental silos to achieve a consistent message to users wherever they interact with an organization (OmnichannelX, 2018). It is concerned with addressing the very problem that Saunders articulates.

At the core of an omnichannel initiative are the disciplines of content strategy and content engineering. We talk more about these disciplines later in the section titled Beyond Content Management.

The Need to Redefine Our Relationship with Subject Matter Experts (Force 3)

A disciplinary pillar of technical communication is the claim (sometimes implicit, but at other times quite explicit) that subject matter experts (SMEs) cannot write and therefore need us. This "us vs them" schema has been active for decades, and some have tried to study it. Mallette and Gehrke (2018), for example, point out that despite the complex reality of their work assignments and the dynamic role they can play, "technical communicators are often still confined to the box of documentation-ist, rather than the more elevated status of subject matter expert … in the various subjects in which they work" (p. 75).

In the early 1990s, Walkowski (1991) conducted a survey of software engineers to document the qualities that they most and least appreciated in a technical writer. Her findings showed a wide gap separating "us" from "them," as stated in the following quote:

> Engineers appreciate working with writers who enjoy being writers. Several engineers complained of writers who secretly (or not so secretly) want to be engineers and compete with them at every turn.
>
> *(p. 66)*

In a complementary study, Lee and Mehlenbacher (2000) surveyed technical writer professionals to address their perceptions toward SMEs. In their study, Lee and Mehlenbacher found that technical writers resented the stereotype that presented them as "glorified secretaries" of the SMEs.

In contemporary content operations, the writing expectations of technical writers and SMEs definitely challenge the mutually exclusive model of decades past. This change is particularly evident when working with application programming interface (API) reference documentation, which Angelini (2018) explains as follows:

> Web service APIs … are code frameworks widely used to offer a huge variety of services and information on the web, making them a strategic asset of web companies (like Google, Facebook, and Amazon). In order

> to integrate web services into their web sites and applications, web developers need a specific type of documentation called 'API reference', which is written following a predefined template.
>
> *(p. 70)*

The need to document APIs often resides in a communication structure that has SMEs taking the roles of authors and readers. In such a structure, a technical communicator needs to understand the product with the same depth as engineers, or an SME needs to be able to follow a style guide and template to create content that compares to what technical communicators can produce.

Influential blogger Tom Johnson, on his blog "I'd Rather be Writing," has written about this trend quite a bit over the past year, claiming that technical communication "has undergone a major evolution from end-users to developers as the target audience" (Johnson, 2018a, para 44) and that "developer tools and languages are becoming increasingly specialized and complex, requiring engineers to play more active, collaborative roles in documentation" (Johnson, 2018b, para 1). Content strategist Keith Schengili-Roberts (2018), who blogs with the pen name of "DITA Writer," notes that as work cycles get shorter and methodologies like Agile take hold, the SME has increasingly become a direct contributor to the process of delivering technical content

A consequence of this force is that content standards like DITA, which were traditionally reserved for technical communicators, now make it easier for SMEs to contribute to content repositories. As Angelini (2018) and others point out, SMEs can write reference topics according to a predefined structure and review topics for quick approval before publishing. However, SMEs used to working in lightweight programming languages can perceive learning DITA or another XML (Extensible Markup Language) grammar as an impediment to getting work done, and prefer to work with simple text formats like Markdown. Lightweight DITA (LwDITA) allows authors to do just that. In his book *Creating Intelligent Content with Lightweight DITA*, Carlos describes LwDITA as "a simplified schema for structuring content, with fewer elements, tighter content models and a simplified specialization architecture to define new types compared to those of DITA XML" (Evia, 2019, p. 16). LwDITA content can be authored in three different compatible formats:

- XDITA, based on DITA XML.
- HDITA, based on HTML5.
- MDITA, based on Markdown.

SMEs and technical authors can create different types of content using these compatible formats. Content topics created in these formats can be easily integrated into deliverables that will not reveal their source language to audiences of developers or end users. Content created in these collaborative workflows

most likely will not be stored in isolated desktop publishing files, but instead will be shared in repositories open for distributed authoring and editing, which are at the center of the next force.

The Need for Continuous Content Development (Force 4)

For decades, the "us vs them" paradigm of SME-technical writer interaction presented in the previous force was maintained by a model of production known as waterfall. A product (physical or digital) was developed in a linear structure and "technical writers' work began at the end of the waterfall process, as products were rolling off the line" (Baehr, 2019, p. 6). Technical writers had to learn how to use the product (frequently based on a prototype or spec) and then document it in a manual for end users. If the product was defective, or if the writer made a typo or spelling error, the user manual would not change until a new version was produced through the waterfall.

A group of "organizational anarchists" (Highsmith, 2001) published *The Agile Manifesto* in 2001 "to contribute to a human-focused turn in how contemporary software development teams are managed" (Lauren, 2018, p. 29). Agile development models emphasize "teamwork, working deliverables, customer collaboration, and responsiveness to change." The Manifesto's principles "are called *adaptive* (or sometimes called *agile*), in contrast to waterfall development's *predictive* product development cycle" (Baehr, 2019, p. 7, emphasis in original). As software developers adopted Agile methods and approaches, the blurry lines between SMEs and technical writers enabled the adoption of Agile in the content development profession.

Primarily in content workflows in which the main deliverable is aimed for online distribution, many technical writers have embraced Agile practices that enable them to treat content components as computer code. Professional communities online and in real life promote the docs-as-code or docs-like-code movement (where *docs* is short for *documentation*). Anne Gentle (2017) lists the following criteria for authors involved in projects treating docs like code:

- Store the doc source files in a version control system.
- Build the doc artifacts automatically.
- Ensure that a trusted set of reviewers meticulously reviews the docs.
- Publish the artifacts without much human intervention.

An overall objective of the docs-as-code movement, which strengthens the previous force, is to enable "a culture where writers and developers both feel ownership of documentation, and work together to make it as good as possible" (Holscher, 2017). Unlike the waterfall environment that saved bug fixes or content corrections for major releases of printed documentation, the docs-as-code culture promotes an environment of continuous integration ("code is continuously tested, integrated

with other code changes, and merged") and continuous development ("code is continuously deployed with each patch to the entire code base") (Gentle, 2017).

In practical terms, this approach to content development, management, and deployment requires a collaborative version control system like GitHub, and a content authoring format that resembles contemporary programming languages. This force represents a challenge for technical communicators used to working in a heavily structured language such as DITA. Practitioners involved in docs-as-code workflows lament that "whereas programming and scripting languages move toward simplified syntax and tagging systems, technical communication continues to rely on XML and complex, nested tag structures" (Evia & Priestley, 2016, p. 26). The tendency to use lightweight programming and markup languages to replace more powerful (and thus more verbose) structures like XML is also modifying the key enabler of the forces shaping content, which we discuss in the next section.

Enabling the Forces: Structured Content Is Key

In the previous section, we presented a brief overview of the primary forces shaping content conversations and activities today. The forces that we have identified in this afterword come from our interaction with the academic and practitioner sides of technical communication and are by no means authoritative or definitive. However, these forces are brought on by rapidly maturing and proliferating technologies transforming our profession and, as a result, require modifications and updates in the curricula of our academic programs.

A transformational effect of these forces that we can already see in the workplace is the need for organizations to create well-structured, semantically-rich content that is human and machine readable. Rob Hanna (2018), for example, has argued that to support seamless content experiences, technical communication practice will demand "greater precision, knowledge, and discipline in how we create content across an omnichannel universe." Content will need to become more granular and contain richer metadata, and each content container (or topic) will need to contain even smaller blocks (elements) of reusable content. The type of content that can be stored in chunks to be assembled based on the needs of a specific audience or context requires a process of structured authoring, which has been defined as "a publishing workflow that lets you define and enforce consistent organization of information in documents, whether printed or online" (O'Keefe & Pringle, 2017, p. 2). We believe that this type of authoring is key to organizations' ability to publish content to many channels and devices, provide seamless customer or user experiences, facilitate collaborative authoring between SMEs and technical communicators, and support continuous content development.

Structured authoring requires the separation of content and presentation, which "can create philosophical and cognitive dissonance for technical

communicators trained to think of information as content that is inherently linked to presentation" (Clark, 2008, p. 36). That separation allows the creation of content "that is planned, developed, and connected outside an interface so that it's ready for any interface" (Atherton & Hane, 2018, p. 32).

In academia, we can no longer afford not to talk about structured content. In its annual survey of over 2,000 self-identifying technical communicators, Adobe (2018) found that adoption of structured content in industry had reached the halfway point, growing from 20% to 50% between 2012 and 2017. This finding suggests that depending on a word processor or desktop publishing tool that combines content and presentation is no longer a workable solution for technical communicators unless the only deliverable to publish is a single PDF document.

In contemporary content workflows, however, not all structured authoring projects look the same. Although some projects in heavily regulated industries or manufacturing environments do require the constraints and full reuse capabilities of DITA XML described by Jason Swarts earlier in this collection, web-aimed content created in Agile processes can benefit from a lightweight language like Markdown. That is the purpose of MDITA, the Markdown-based authoring format of LwDITA, which Carlos introduces and explains in his book *Creating Intelligent Content with Lightweight DITA*.

Beyond Content Management

Now that we have described the forces shaping content conversations and activities in industry and academia, this section will connect those forces to the present and future of content management as a term and object of study.

Adopting a More Precise Definition of Content Management

The term "content management" is a small umbrella to cover all content-related work. In academic conversations and publications in general, we have used *content management* to describe a wide variety of activities related to publication in digital environments. In this collection, Saul Carliner (Chapter 2) analyzes the complicated relationship between content management and technical communication. Carliner points out that technical communicators do not have a single identity and that jobs in our field vary widely. The same can be said about *content management* as a concept, and as a field we need to be more precise in how we talk about content activities. This content misnomer also affects industry conversations and, most importantly, job postings. Jokingly, Carlos and some technical content consultant friends have started talking about the *cosa nostra del contenuti* or "this content thing of ours" because *content management* or even *component content management* do not really explain all the activities and processes behind the planning, creation, publication, and revision of content.

In industry and academia, content management comes in web content management, component content management, enterprise content management, and many other flavors depending on the specific discipline or even organization using the term. Deane Barker (2016a) addresses this naming problem from the perspective of web content management. He defines *content* as "information produced through editorial process and ultimately intended for human consumption via publication" (p. 5). Barker adds that this definition "points to a core dichotomy of content management: the difference between (1) management and (2) delivery." He claims that these two disciplines require different skills and mindsets, and that "the state of current technology is creating more and more differences every day" (p. 5).

Although Barker only mentioned two disciplines, recently "content management" has been used as a general term to describe job titles and activities related to content strategy, content engineering, content development, and bona fide content management. We thus argue for a move beyond content management to a more unified understanding of the many forces that shape content today.

Bringing Content Forces and Activities into Conversation

To take under consideration the forces we have presented in this afterword and to provide a more specific definition of job titles and activities related to content, we propose two approaches that have been used in professional conversations. One places content-related activities under the banner of "Content Operations" (CO, or ContentOps). Content operations is "the behind the scenes work of managing content activities as effectively as possible" with a mix of "elements related to people, process, and technology" (Jones, 2019, p. 162). Therefore, content operations is the "glue" between the (1) plan for content, and (2) the content management system in which it is managed and delivered (Barker, 2016b).

Another, more granular approach calls the "disciplines of content" by specific names, which include:

- *Content strategy* (the "what"), which defines strategic direction and focuses on the plan, the vision.
- *Content engineering* (the "how," "when," and for "whom"), which defines content structure, metadata, content reuse planning, taxonomy, and other content relationships.
- *Content management* (managing content after it has been created), which defines the operational processes supporting the content lifecycle, including policies, workflows, permissions, and editorial activities as supported by a content management system (Saunders, 2015).

As developers of curriculum at the course and program level, we need to think about roles and specialized skills associated with the different disciplines related to content beyond management.

Looking Forward

Miles Kimball (2016), in "The Golden Age of Technical Communication," characterizes the move to content management as the *Glass Age* of technical communication, the essence of which is the separation of content from form. This separation, he suggests, necessarily also separates strategic design from writing. Whereas technical writers in Content 1.0 contexts drew on their specialized knowledge and rhetorical expertise to decide how best to design, organize, and write documents, technical writers in post-Content 1.0 contexts "no longer design an integrated document in which they strategically apply visual and lexical rhetoric to solve human problems" (p. 9). Rather, they perform the "mundane task" of writing content chunks in accordance with standards and architectures designed by those in strategic design roles.

Kimball (2016) suggests that those in strategic design roles comprise a "smallish group of people paid well to think strategically about design, rhetoric, visualization, presentation, information architecture, technology, and usability" and those in technical writing roles comprise a "much larger, less-well-paid group of people who write fragmented paragraphs that they save to a database, never knowing exactly where or how they will be used" (p. 10). Although this description arguably underplays the rhetorical decisions that technical writers still must make in any communication context, the description does point to a decline of rhetorical agency for those in more traditional writer roles.

The authors in this collection provide ideas and examples that technical communication educators can use to prepare students for these more strategic roles that will, we hope, afford them meaningful agency in the profession. Carliner, for example, encourages educators to approach content management not as a technology but as an aggregate of asset management processes, editorial processes, reuse workflows, and various other system and human activities. Doing so puts the focus on the contributions of different roles (e.g., planner/designer, creator, production specialist, manager) engaged with content management and on developing curriculum aligned with those roles. Likewise, Hart-Davidson and Lauren (Chapter 10) offer the concept of "writing stewardship" as a way to understand the important but often invisible work of technical writers in organizations doing content management.

We would be remiss in this afterword if we did not address the topic of faculty training. Although this collection offers a variety of tested approaches for teaching content management to students (e.g., Potts and Gonzalez's assignments for web content strategy in Chapter 3, and Gesteland's introduction to XML in Chapter 6), it does not have the purpose of replacing a complete curriculum to

prepare faculty to be competent teachers of content management. So how can faculty gain the requisite skills and knowledge to advance content management curricula? How can they do this with the limited time, resources, and institutional support available to them? Some ideas include the following:

- *Participate in a content management learning community for faculty.* We imagine organizations such as the Council for Programs in Technical and Scientific Communication (CPTSC) or Association of Teachers of Technical Writing (ATTW) sponsoring learning communities for faculty interested in developing skills and competencies associated with strategic design roles in the landscape of content operations. These communities would, above all, support learning, and perhaps might be viewed as virtual makerspaces, where members collaboratively problem-solve as they make content things.
- *Complete free online training.* Scriptorium, for example, hosts a series of free DITA courses at learningdita.com.
- *Participate in industry webinars, workshops, and online communities.* The Content Wrangler, the Data Conversion Laboratory, and Scriptorium offer free and frequent webinars focused on content management topics. Comtech Services and STC offer regular workshops, though at a cost. The Write the Docs community is active and welcoming and focused on improving the art and science of documentation.
- *Collaborate with industry organizations.* Academic organizations, such as ATTW and CPTSC, might collaborate with industry organizations such as CIDM to establish a professional development exchange program. Academic organizations could offer workshops and webinars on topics of interest to industry peers, such as research methods; in exchange, industry organizations could offer workshops and webinars to academic peers on a variety of topics pertinent to the content disciplines.
- *Seek out teaching-focused content management scholarship.* This collection should be at the top of the list, of course. But there are many additional resources, such as *Creating Intelligent Content with Lightweight DITA* (by Carlos Evia) and "Leveraging Industry Onboarding Materials in the Curriculum" (by Stan Doherty, 2017).

Along with faculty training, our field in general and programs in particular need to think about updating pedagogy courses for technical and professional communication graduate students interested in an academic teaching career. The composition pedagogy courses that the majority of programs require graduate students to take are not sufficient, often leaving those hired to teach and contribute to technical communication curricula unprepared. Some existing technical communication pedagogy courses are focused on preparing graduate students to teach the technical writing service course for an audience

of science or engineering majors. The genre-based approach of many of those courses, however, can be antithetical to the agnostic content mantra of contemporary content operations.

And finally, looking forward, we believe that ongoing collaboration between academic programs and industry partners will be essential to preparing future technical communication professionals for success in a Content 4.0 world and beyond. Internship and mentorship programs will continue to be central to this preparation. Such experiential learning programs provide opportunities for students to apply what they are learning in the classroom to workplace situations and to gain hands-on experience with the processes, standards, and tools of the trade. Pairing students with more experienced technical communicators through mentorship programs also affords students potentially rich learning opportunities, networking opportunities, and career guidance. Creating advisory boards, too, can help shape program and curricular development, particularly in the areas of structure authoring, content strategy, and content engineering. The Technical Communication Advisory Board at the University of Minnesota Twin Cities serves as a model for how industry partners can contribute to content management competency development at the curricular and program levels. See Duin and Tham (2018) for a rich description of the board and how its members contribute.

In addition to inviting industry partners to serve as internship site supervisors, mentors, and advisory board members, programs might consider inviting them to share onboarding and other training materials designed for new hires. These materials might then be adapted for courses and for faculty development. Stan Doherty's Project Alcuin, an open-source repository of onboarding material for academic technical communication programs, is a great place to start (see Doherty, 2017). The repository[1] includes sample content in multiple source formats and architectures and a series of exercises focused on linear and modular writing, content and markup, content maintenance, content reuse, and intelligent content assembly.

Conclusion

Positioned on a bridge that connects information technology to the humanities, technical communication can rightfully claim credit for many episodes of humanizing technology that have made the world a better place. At the same time, that connection also carries the responsibility of constant learning. Whereas some of our neighbors in fields more traditionally grounded in the humanities can successfully teach the same text for decades, faculty in technical communication need to constantly update their syllabi and research interests.

1 See https://github.com/StanDoherty/project-alcuin.

An easy first step is to keep a finger on the discipline's pulse through social media and academic conferences, but more advanced levels of involvement include pursuing, as much as possible, continuing education opportunities, and seeking input from alumni and practitioners on course and curriculum design.

Some feel that this call for constant learning perpetuates a stereotype of the academic side of technical communication as subservient to the needs of industry. We believe that a harsh reality is that the relevance and sustainability of our field will depend, in part, on the extent to which our students are prepared for roles that afford them meaningful agency within the landscape of content operations. Additionally, a healthy relationship with industry based on reciprocal understanding and collaboration can enhance research agendas to support creativity and innovation for the next chapters of our field. And in one of those future chapters, we will redefine content management as a term, practice, and object of study.

References

Abel, S. (2017). Author: Scott Abel. Retrieved June 26, 2019, from https://thecontentwrangler.com/author/scottabel/#.

Abel, S. (2018a, December 13). The state of technical communication 2019 [Webinar]. Retrieved June 26, 2019, from www.brighttalk.com/webcast/9273/338293/the-state-of-technical-communication-2019.

Abel, S. (2018b). An interview with Cruce Saunders. *Intercom*, *65*(5), 22–26.

Adobe. (2018). Adobe Tech Comm Survey 2017–2018 Findings. Retrieved November 21, 2018, from www.adobe.com/mena_en/products/technicalcommunicationsuite/whitepapers/adobe_tech_comm_survey_2017-2018_findings.html.

Andersen, R. (2014). Rhetorical work in the age of content management: Implications for the field of technical communication. *Journal of Business and Technical Communication*, *28*(2), 115–157.

Andersen, R., & Batova, T. (2015). The current state of component content management: An integrative literature review. *IEEE Transactions on Professional Communication*, *58*(3), 247–270.

Angelini, G. (2018) Current practices in web API documentation. *Proceedings of the European Academic Colloquium on Technical Communication*, 70–85.

Atherton, M., & Hane, C. (2018). *Designing connected content: Plan and model digital products for today and tomorrow*. San Francisco, CA: New Riders.

Baehr, C. (2019). *The agile communicator: Principles and practices in technical communication*. Dubuque, IA: Kendall Hunt.

Barker, D. (2016a). *Web content management: Systems, features, and best practices*. Sebastopol, CA: O'Reilly.

Barker, D. (2016b, January 27). The need for content operations. Retrieved June 26, 2019, from https://gadgetopia.com/post/9307.

Batova, T. (2018). Global technical communication in 7.5 weeks online: Combining industry and academic perspectives. *IEEE Transactions on Professional Communication*, *61*(3), 311–329.

Batova, T., & Andersen, R. (2017). A systematic literature review of changes in roles/skills in component content management environments and implications for education. *Technical Communication Quarterly*, *26*(2), 2017, 1–28.

Clark, D. (2008). Content management and the separation of presentation and content. *Technical Communication Quarterly*, *17*(1), 35–60.

Doherty, S. (2017). Leveraging industry onboarding materials in the curriculum. *Proceedings of the 35th ACM International Conference on the Design of Communication – SIGDOC 17, 5 pp.*

Duin, A.H., & Tham, J. (2018). Cultivating code literacy: A case study of course redesign through advisory board engagement. *Communication Design Quarterly*, *6*(3), 44–58.

Edwardson, A. (2019, February 13). Content operations? How to collaborate on content (effectively). Retrieved March 1, 2019, from www.boye-co.com/blog/2019/2/13/content-operations-how-to-collaborate-on-content-effectively.

Evia, C. (2019). *Creating intelligent content with Lightweight DITA*. New York, NY: Routledge.

Evia, C., Eberlein, K., & Houser, A. (2018). *Lightweight DITA: An introduction*. Version 1.0. OASIS.

Evia, C., & Priestley, M. (2016). Structured authoring without XML: Evaluating Lightweight DITA for technical documentation. *Technical Communication*, *63*(1), 23–37.

Evia, C., Sharp, M.R., & Pérez-Quiñones, M. A. (2015). Teaching structured authoring and DITA through rhetorical and computational thinking. *IEEE Transactions on Professional Communication*, *58*(3), 328–343.

Gartner (2016, October 18). Smarter with Gartner. Retrieved February 2, 2019, from www.gartner.com/smarterwithgartner/gartner-predicts-a-virtual-world-of-exponential-change.

Gentle, A. (2017). *Docs like code: Write, review, test, merge, build, deploy, repeat*. Austin, TX: Just Write Click.

Gollner, J. (2016b, December 28). Content 4.0. Retrieved June 26, 2019, from www.gollner.ca/2016/12/content_4-0.html.

Gollner, J. (2016a, September). "Are you ready for Content 4.0? The shape of things to come and how to prepare for it." Paper presented at the CIDM Best Practices Conference, Santa Fe, NM.

Hanna, R. (2018, April). "Preparing content for intelligent machines." Paper presented at the CIDM CMS/DITA North America Conference, Denver, CO.

Highsmith, J. (2001). History: The Agile Manifesto. Retrieved June 26, 2019, from https://agilemanifesto.org/history.html.

Holscher, E. (2017). Docs as code. Retrieved June 26, 2019, from www.writethedocs.org/guide/docs-as-code/.

Johnson, T. (2018a, October 2). Tech comm trends: Providing value as a generalist in a sea of specialists (Part II). Retrieved June 26, 2019, from https://idratherbewriting.com/2018/10/02/providing-value-as-generalists-in-specialist-contexts-part-2/.

Johnson, T. (2018b, October 2). Tech comm trends: Providing value as a generalist in a sea of specialists (Part I). Retrieved June 26, 2019, from https://idratherbewriting.com/2018/10/02/providing-value-as-generalists-in-specialist-contexts-part-1/.

Jones, C. (2019). *The content advantage [Clout 2.0]*. San Francisco, CA: New Riders.

Kimball, M.A. (2016). The golden age of technical communication. *Journal of Technical Writing and Communication*, *47*(3), 330–358.

Lauren, B. (2018). *Communicating project management: A participatory rhetoric for development teams*. New York, NY: Routledge.

Lee, M.F., & Mehlenbacher, B. (2000). Technical writer/subject-matter expert interaction: The writer's perspective, the organizational challenge. *Technical Communication*, *47*(4), 544–552.

Mallette, J.C., & Gehrke, M. (2018). Theory to practice: Negotiating expertise for new technical communicators. *Communication Design Quarterly*, *6*(3), 74–83.

O'Keefe, S., & Pringle, A. (2017, April 12). *Structured authoring and XML*. Research Triangle Park, NC: Scriptorium Publishing Services. Retrieved May 17, 2019, from www.scriptorium.com/structure.pdf.

OmnichannelX Conference. (2018). Retrieved June 26, 2019, from https://omnichannelx.digital/.

Saunders, C. (2015). *Content engineering for a multi-channel world: Enabling the next generation of customer experiences*. Austin, TX: Simple A.

Saunders, C. (2018). A new content order for the multi-channel, multi-modal world. *Intercom*, *64*(1), 9–11.

Schengili-Roberts, K. (October, 2018). *The rise of the SME within technical communications*. Paper presented at the LavaCon conference, New Orleans, LA.

Singh, A. (2018, March 21). Adobe Tech Comm Survey 2017–2018 [Webinar]. Retrieved June 26, 2019, from https://techcomm-trends-2018.meetus.adobeevents.com/.

StatCounter. (2016, November 1). Mobile and tablet internet usage exceeds desktop for first time worldwide. Retrieved June 26, 2019, from http://gs.statcounter.com/press/mobile-and-tablet-internet-usage-exceeds-desktop-for-first-time-worldwide.

Stevens, D., & Madison, K. (2018). 2018 publishing trends. *CIDM Best Practices Newsletter*, *20*(4), August, 71, 74–81.

Walkowski, D. (1991). Working successfully with technical experts—from *their* perspective. *Technical Communication*, *38*(1), 65–67.