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Data Analytics for TPC Curriculum

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Abstract: Despite serving as a user analysis tool for technical communicators where usability testing methods fall short, data analytics remains underdeveloped in technical and professional communication (TPC) pedagogy. In this article, we discuss the value and means to incorporate data analytics in existing TPC courses both to prepare students for the workplace and as a way to provide an accessibility-driven framework to perform user studies through data analysis methods for practitioners.
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Audience analysis is a fundamental technique in technical and professional communication (TPC) research and practice. The field focuses on meeting the needs and solving the problems of users, requiring an in-depth understanding of audiences. Researchers have called on the field to improve and expand its understanding of audiences (Bowie, 2004; Johnson, 1998; Miller-Cochran & Rodrigo, 2009). Rather than conceptualizing the audience as a summation of individual characteristics that generalizes audience interactions, the goal of recent work is to identify the unique problems of individual users (Ranade, 2021). To understand individual needs, we argue that technical communicators must use tools that provide deeper insights into users' information consuming behavior, and data analytics is one way of doing that (Bekavac & Garbin Praničević, 2015; Hocutt & Ranade, 2019).

Data analytics represents a popular approach to performing audience analysis. One branch of data analytics is web analytics, where proprietary tracking code collects data on user activity on the site as well as user-specific information. After collecting, aggregating, and processing data, web analytics platforms provide reports that are used by practitioners like developers, designers, content

managers, and writers to create and revise content. Despite these benefits, data analytics remains an under-researched area in TPC pedagogy. The goal of this article is not only to promote data analytics discussions in the field but also to analyze it critically as a tool to understand audience behaviors.

This article positions data analytics as a complex information system (Albers, 2015; Slattery, 2007) that serves as a tool for technical communicators managing web content to conduct user analysis when usability testing methods necessarily fail to measure large-scale, individualized user experiences. In the following sections, we describe the use of data analytics to understand user characteristics and behavior, validate findings from other user studies within and outside any organization, and make content changes based on the final findings. We also propose ways to include data analytics studies in TPC pedagogy.

User Characteristics & Behavior

Our approach to data analytics is informed by the following assumption: When hired, many entry-level technical communicators will be asked to manage and update existing web information architecture, design, and content (Batova & Andersen, 2017; Carliner & Chen, 2018). While their classroom instruction probably will have covered user-centered design, structured content, and usability testing (Flanagan & Getto, 2017; Melonçon, 2018), the reality of a technical communication generalist's position likely offers few opportunities to run lab-based usability testing or pull together representative focus groups. Instead, entry-level technical communicators will likely be given access to a basic content management platform like WordPress or Drupal, to content authoring tools, and to data reports generated by a web analytics platform such as Google Analytics (Hocutt, 2016). Entry-level technical communicators will be expected to know how to read reports generated by data analytics tools, to identify user behaviors and characteristics from such reports, and to use these results to develop actionable information architecture, design, and content updates to implement on the website. This expectation may come as a surprise to entry-level technical communicators who've been trained in critical approaches to audience analysis. We believe adding data analytics to the critical UX tools and methods taught in technical communication classes can better prepare students to structure and manage information systems in their workplaces.

We position critical data analytics as a digital literacy that effectively responds to today's workplace, which is likely informed (if not influenced or even driven) by an influx of big data, machine learning, and artificial intelligence agents. Critical data analytics encourages technical communicators to examine data sources and collection methods, data configuration and processing activities, and data reporting tools and guidelines to draw user-centered conclusions. At the heart of our approach is the user, for whom technical communicators must advocate by understanding how tools like web analytics can surface insights into user behaviors and characteristics.

Specifically, analytics can be used in the construction of what we call the hidden

user. A hidden user is one who implicitly participates in information production, especially through invisible mechanisms (Ranade, 2021). Implicit participation, or the subtle conscious engagement of users in online communities, provides more information about their agency (Schäfer, 2011). It can be achieved by implementing user activities into user interfaces and back-end design; social media applications thrive on implicit participation. Data analytics is an example of implicit participation. As users navigate a website, their browsing data gets recorded. Analytics tools help retrieve that data. Unlike qualitative mechanisms such as feedback from comments posted on websites, social media posts, and the results of usability testing, the characteristics of users that can be derived from browsing data are buried and require special skills to reveal. The analysis goes beyond the rhetorical understanding of audiences; technical communicators need to collect the data, develop specific research questions that will answer audience-related questions, and develop personas from the results. The persona-building exercise helps map user demographics and their information seeking behaviors (such as search keywords, entry and exit pathways, and technologies used to retrieve and consume information) to content design.

Validate Findings Using Internal and External Data Sources

Understanding users is one benefit of using data analytics methods. Another benefit is to support findings from other user research methods. We believe that audience analysis is more reliable when conducted using more than one method. While user characteristics can be identified using the aforementioned mapping of users' characteristics, findings can be validated using other data points from the information delivery process. Such data can be collected from organizations' stakeholders and can be used to achieve overall organizational goals. For example, support teams in software organizations often document data from calls with their customers. Content from conversations initiated by users to request help from support teams, along with other feedback collected from users, can be compared to findings from data analytics. Probable results from such comparisons can be used to validate decisions such as whether the documentation keywords and customer queries coincide, or whether the information architecture (IA) matches with customer wayfinding. On the other hand, data analytics findings can be used to strengthen usability test findings. For example, content localization decisions can be made based on demographic data which, due to resource constraints, may not appear in usability testing findings.

Recommend (or Make) Website Changes Based on Conclusions Drawn through These Findings

With the validated data about users from critical data analytics, we believe technical communicators can recommend or make website design, IA, and content updates that meet user needs that may go overlooked by traditional usability testing and audience analysis techniques. Large-scale, aggregated user characteristics like computer platform, operating system, and device type

can help identify both the most popular view mode (mobile, tablet, or desktop) and the least-well addressed operating systems and browsers. Both sets of user characteristics are important, as they reveal user technology patterns for which experiences can be designed. Similarly, large-scale, aggregated user behaviors like entry pages, exit pages, time on site, and time on page can help identify web content that is easy to find and useful or difficult to find and unhelpful to the user. Again, both sets of user behaviors are important, as they reveal user experiences to which content, design, and IA can be tailored.

We offer three examples that demonstrate specific ways data analytics can supplement traditional UX methods to update content, design for accessibility, and IA.

First, we exemplify the value of data analytics to web content. Data showing how far users scroll down a long page can provide insight into users' engagement with page content. In the context of users' intent, willingness to scroll may suggest high levels of engagement with the content, suggesting it answers specific questions that users are asking of the content. Importantly, scrolling patterns combined with time on page and page-level bounces may suggest the content is being scrolled in hopes of finding, but ultimately failing to find, relevant answers. User behavior data from data analytics provides supplemental findings that, once validated with internal and external sources, can offer concrete content updates to continue meeting, or better meet, users' needs.

Second, we exemplify the value of data analytics to accessibility. Content audits can identify potentially troublesome content and designs for accessibility, especially in tables, videos, PDFs, images, and icons. Such elements in web designs require intervention to ensure all users can access them. But such content audits may not provide a full picture of the user experience of those elements: Time on page, bounce rates, exit page lists, and the results of automated accessibility checking tools provide evidence that accessibility interventions are, or are not, making the elements in question more accessible. Data analytics offers a supplemental method to ensure that interventions are having the desired effect of making the content more accessible. While focus groups and usability studies can certainly achieve this result, web analytics offers another method for confirming results.

Third, we exemplify the value of data analytics to IA. While user profiles can help technical communicators create or recommend initial website IA and user pathways, data analytics can be used to identify pathways through the data and to determine whether existing pathways and the IA that supports them are being followed. Where there's agreement between initial IA and user pathways through the content, data analytics offers confirmation that IA is meeting users' needs. Where initial IA and actual user pathways through web content diverge, additional data like pages visited, time on page, and session length can help recommend emerging IA options to be incorporated into the design.

Pedagogical Implications for TPC Programs

Data analytics is a specialized skill that is not covered in most TPC pedagogy. We argue that, although TPC students may not need certifications or specialized courses from fields like data sciences and computing, they will benefit from incorporating digital literacy perspectives that may help them make sense of data to evaluate users. In their work, Ann Hill Duin and Isabel Pederson (2021) explain that digital literacy for writing in the future using technologies means "no longer viewing human and machine as separate agents along with the ability to envision and write within mirror worlds of virtual fragments stitched together" (p. 40). It requires collaborating with stakeholders beyond current relationships and using devices to enhance the ability to expand our capabilities to solve problems. Based on Duin and Pederson's commentary, we have identified three key pedagogical areas where data analytics can be incorporated into the TPC curriculum.

First, address technological embodiment. This concerns technical and professional communicators' ability to understand how technology shapes human interactions, thereby providing opportunities for revealing the hidden users in rhetorical situations. Lisa Melonçon's work (2013) concerns the merging of technologies and users and understanding what that relationship means and its impact on our work. She also argues that as technical communicators, instead of being technologically deterministic or culturally deterministic, we can closely analyze humans and the outcomes of their interactions with technology by focusing on the connections between technology and humans. In the classroom, we can introduce data analytics platforms to teach the benefits and limitations of data collection and reporting while focusing attention squarely on tracking user behaviors. Using these tools, we can work with students to develop nuanced and detailed personas for design and development. By considering data analytics as an extension of our capabilities to reach out to our users, instead of looking at it from a scientific lens, we can help students consider and perform more effective user research methods. Therefore, data analytics can be included in courses such as user experience, usability testing, digital rhetoric, and other courses that involve user research and analysis.

Second, project how one's body adapts to networks, assemblages, or even as a host for future human and nonhuman collaboration in ambient interactive relationships. As we use technology to create and distribute knowledge, networks of human and non-human actors (Latour, 1987) are created and dynamically reconfigured each time a user interacts with the information platforms. Networks of participants who contribute to this knowledge network are created and destroyed to contribute to data that can be used for audience contextualization and knowledge creation takes place (Ranade, 2021). Thus, collaborations are an integral part of technical communicators' jobs. In the classroom, we can introduce technology and organizational elements as collaborators in knowledge creation, with all their benefits and limitations, creating a perspective that shifts based on the needs of organizations and users. By focusing on agency that emerges from human-technology partnerships, students can develop a future-prepared approach to user analysis that takes into account

the human user's partnering with technological actors. TPC curriculum can address the need for such dynamic relationships through courses like publication management, content strategy, and information design. The aforementioned recommendations for website developers require crossing boundaries between different teams in an organization. Understanding the networked relationships will help TPC students navigate organizational structures.

Third, identify collaboration-enabling features. As mentioned before, users can be hidden, but they reveal themselves through their interactions which often take place through technological platforms. This requires an understanding beyond writing and content organization. Duin and Pederson (2021) suggest that students should be able to articulate how human–nonhuman collaboration shapes communicative actions. In the classroom, this focus can be achieved by engaging students with data analytics platforms to surface user patterns and behaviors. Web analytics platforms offer unique insights into human-nonhuman relations by offering a technology-based digital interface to explore how users engage with digital content on digital, online media. By identifying and/or encouraging a focus on ways humans interact with technologies, students will not only be able to visualize those relations, but also be equipped to design more accessible information platforms.

Specific Examples for TPC Classes

Two co-authors, Chen and Davis, developed assignments using data analytics while participating in a data analytics workshop funded by a 2021 CPTSC research grant. These assignment ideas demonstrate the potential role that data analytics can play in TPC classes.

Chen's Assignment. In a business communication class assignment asking students to develop a business of their own, one method for user analysis could be data analytics. Using a tool like Similarweb (similarweb.com), students can conduct audience and marketing channel analysis for any website or app, including those that could be competing with the students' business. Since a reasonable assumption would be that the competitors' businesses share some target users with those of the students, analyzing the existing competitors' business websites can be a good starting point for students to gauge some basic metrics of their users, including geographic distribution, age, annual income, interests, industry distribution, browsing interests and preferences, and more.

Davis' Assignment. Students in technical communication courses can practice audience or user analysis by developing personas based on data analytics. An assignment or activity like this would be grounded in user data from a specific website. Instructors may consider department websites as a focus or other sites that might be easily accessible. Students would first be tasked with interpreting user analytics, such as user demographics, behavior, and interests, before creating user personas that reflect their interpretations. While it may be difficult to both find a specific website that can act as the source of user analytics and to determine how students will access the analytics, this type of activity introduces students to the type of language and interpretation processes commonly used by professionals who

draw on analytics to understand their audiences.

Conclusion

Critical data analytics are already in widespread use among marketing communications specialists. The results of data analytics are used in paid and organic marketing efforts across digital platforms. While marketing and technical communication specialties may have different purposes—marketing may seek to persuade while technical communication may seek to inform—a user-centered approach across the vast array of platforms on which content is encountered by users requires more than small-scale usability testing and focus groups. To meet the needs of users across the ecology of platforms that distribute content, technical communicators need to supplement existing UX studies methods with data analytics. To achieve this goal, technical communication classes need to provide instruction in the use of data analytics for audience analysis. We've started the process using the research grant from CPTSC to explore, develop, test, and distribute hands-on workshops for technical communicators to incorporate data analytics instruction in their classes. We're excited to share these results and resources with you.

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