

User Preferences of Software Documentation Genres

Ralph H. Earle
IBM Corporation
Durham, NC USA
ralphe@us.ibm.com

Mark A. Rosso
North Carolina Central University
Durham, NC USA
mrosso@ncsu.edu

Kathryn E. Alexander
IBM Corporation
Durham, NC USA
kealexan@us.ibm.com

ABSTRACT

Today's technical software users find a wide variety of content online, from videos to forum posts to online articles. This study examines the extent to which the genre of this content matters to the users searching for it. It presents the findings of a new exploratory study that addresses the significance of genre preferences to the users, given that genre is secondary to their actual business goals. It looks at documentation users' usage of, and attitudes towards, documentation genres, and how factors such as work role and past experience come into play. Our conclusions can help individuals who formulate content strategies to understand the extent and strength of genre usage. This in turn can help them determine a strategic mix of documentation genres.

Categories and Subject Descriptors

H.5.2 [User Interfaces]: Training, help, and documentation; Theory and methods

General Terms

Documentation, Design, Experimentation, Theory, Human Factors

Keywords

Genre, Online Content, Source Selection, User Satisfaction

1. INTRODUCTION

With today's proliferation of online information of all varieties, the concept of "software documentation" is evolving. Technical software users looking for help to achieve their business goals can expect to find a wide variety of technical content online. And the ubiquity of open-source software in almost every complex software solution ensures that documentation authored by a single software vendor is no longer adequate but is inevitably supplemented with alternatively-sourced content written by third-party providers or end users who have grappled with similar challenges. A typical search for technical content might return YouTube videos, forum posts, and online articles in addition to traditional documentation. Even the concept of "documentation" is expanding from the traditional single genre of online or hardcopy manuals bundled with the software product. Software users are now exposed to a full range of technical content in a variety of genres.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than the author(s) must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from Permissions@acm.org.
SIGDOC '15, July 16 - 17, 2015, Limerick, Ireland
Copyright is held by the owner/author(s). Publication rights licensed to ACM.

ACM 978-1-4503-3648-2/15/07...\$15.00

DOI: <http://dx.doi.org/10.1145/2775441.2775457>

This study views computer documentation through the lens of genre theory. It examines the extent to which the genre of technical content is significant to users who are searching for it. The various types of documentation, such as product help systems, videos, and online forums, can be viewed as genres. They fit the definition of genre as "typified communicative actions characterized by similar substance and form and taken in response to recurrent situations" [40]. For example, most people know that a frequently asked questions document (or FAQ) is a set of question and answer pairs (generally represented as a static document or as a set of questions containing hyperlinks to their answers).

Awareness of document genre characteristics can be beneficial to both the document producer and the intended audience. As a computer documentation provider, one can simply adhere to the conventions of purpose, form, and content of the typical FAQ when producing an FAQ document. Following widely recognized conventions simplifies the task of document production. As a reader, one would immediately recognize a document as an FAQ by its conventional form and apply this knowledge in using (or deciding to use) the document.

In the professional environment, a variety of terms are used to indicate genre. For example, in a document repository used by software engineers in a large technical corporation, the term used was "artifact type" [9]. The term "document type" is also common. The usage of such terms varies by industry and even among different vendors in the same industry. Therefore, this study adheres to the term "genre."

The initial impetus for this inquiry came from the IBM® Rational product documentation group, in which two of the three co-authors work. Because of this, the research focuses on corporate professionals' use of documentation of software that they are *using* in service to the development and maintenance of other software systems. This use of documentation is distinct from studies in the literature that investigate corporate professionals' use of documentation for systems that they, the users themselves, are *developing, and documenting the development of*. This type of documentation is usually referred to as developer (or internal or technical) documentation (e.g., [5, 10]).

The ultimate goal of the study was improving the user experience with the software. Some large enterprise software products, such as Rational Team Concert and Rational DOORS, are sold with help systems containing thousands of topics. When other groups, both inside and outside IBM, publish additional content in an effort to assist user subsets, the content availability through web searches leads to a potentially bewildering array of choices.

In this environment, it becomes critical to understand the extent to which users consult certain content genres and how these choices are related to factors such as role, product maturity, and familiarity with the product. This understanding can lead to more efficient and user-centric planning of content and content-delivery architecture.

2. LITERATURE REVIEW

There is a wealth of research regarding what documentation sources are used and how frequently they are used. When users are asked what they want in documentation, the answers depend on who is asked. A diverse cross-section of respondents, using mostly common office applications, said that they wanted ease of navigation, appropriate levels of explanation, documentation organized around specific problem-solving, something easy to read with visual examples, and completeness and correctness [25]. Software engineers were interested in topicality, the level of specificity, relationship to specific case or scenario, genre, currency, product or technology version, author, and source [8]. For the most part, studies investigate users of differing characteristics (for example, age, level of expertise, business vs. personal use, technology used, task-type, etc.). This explains why one can find studies that say users do not read the documentation (e.g., [26]), that users do read the documentation (e.g., [37]), that few use printed documentation (e.g., [24, 30]), and that printed documentation is essential [21]. Some studies report that documentation is one of the least preferred ways to solve problems [1, 39]. Due to methodological inconsistencies and weaknesses, many of the prevailing views of documentation use are inconsistent, and to some extent, inaccurate. Novick et al. [24] provide a review of these types of inconsistencies and other methodological issues surrounding documentation research.

2.1 Genres of Documentation

The application of genre theory to documentation “would allow writers to view computer documentation not simply as a form of writing but as a set of communicative interactions” [41] (p.23). For writers, documentation genre has been included as one of the five critical dimensions of all support documentation [20]. From the perspective of the computer user, “someone who knows a particular document’s genre also knows significant things about a document, sometimes enough to make a judgment regarding the document’s relevance to an information need” [31] (p. 1054). Thus, a computer user needing help might look for certain genres of documentation or at least recognize a certain genre of documentation as possibly containing a solution to the user’s problem.

One characteristic of genre, according to genre theory, is its fluid nature, changing over time to accommodate people’s changing patterns of use. For example, over the history of computer documentation, a variety of genres (e.g., manuals, reference sheets, guidebooks, keyboard templates, online help screens) have emerged and vanished, and genres continue to evolve as computer usage has changed over time [35, 41]. At one company, archives show that computer documentation genres like checklists, memos, and procedures manuals are no longer used [41]. New genres can also evolve from old genres: for example, early online documentation was just printed documentation hosted online in the same format [36]. Pflugfelder [28] describes the evolution of the computer manual in terms of genre theory:

“...I am also suggesting that the manual—as a genre—is changing. Such a claim should come as no surprise to those familiar with rhetorical notions of genre that suggest they are temporarily stable understandings of continuously variable forms.... The instruction manual, as a longer, written form of user documentation, emerged to accommodate an audience that wanted a direct way to engage a product and/or process.... The manual, as one of the most common technical communication genres, has been slowly

mutating in response to a wide array of influences, sometimes emerging as a user-created wiki, sometimes as an ad hoc messageboard with threads of responses, and at other times as a short video designed to encourage and enable product use.” (p.133)

It is an open question whether this genre evolution has improved documentation quality. Over fifteen years ago, it was lamented that “despite the shift from system-oriented to task-oriented documentation and the great variety of documentation strategies developed in recent years, it would be difficult to argue that computer documentation is any more advanced than it was at its inception” [41]. The same argument could be made today.

2.2 Documentation and User Needs

One issue on which the literature has reached consensus is that user needs vary by experience level, often couched in such terms as: novice versus expert, years of experience, level of familiarity with the software, etc. Mitchell [21, 22] also found that the more experienced the user, the more satisfied they were with the documentation. Li, et al. [17] found that help-seeking behavior of software developers differed by amount of experience.

A few studies linked the usefulness of specific document genre to the user’s experience level. For example, O’Malley, et al. [27] suggested “that existing documentation is not sensitive enough to the variety of levels of user expertise, nor to the variety of contexts in which on-line help is required.” They identified three types of help facilities that users of a UNIX system may need, based on observation of use of the embedded help and by soliciting user comments: quick reference, task specific help, and full explanation (which includes tutorials).

In a series of studies, Freund concluded that the usefulness of specific document genres varied according to the task that the user was performing. Freund [7] found that perceived usefulness of specific document genre for specific task types was negatively related to level of expertise but cautions that expertise level may be conflated with the challenge level of the work performed. Her results also suggest that using specific genres may not add sufficient value for either very easy or very difficult tasks [7]. She also found that the user’s familiarity with the subject matter of a particular project, task, or search impacted users’ information behavior [6].

Documentation providers seem to have responded by providing a variety of documentation genres. For example, Postava-Davignon et al. [30] reported one company’s documentation repertoire to include “tutorial-style ‘getting started’ sections oriented towards new users, task-oriented ‘user guide’ topics” and reference material both printed and online.

2.3 Documentation Alternatives

Although many software vendors now provide a variety of documentation genres, today’s users have choices beyond the traditional vendor-supplied documentation. For example, online forums [11], feature guides [13], email list servers and FAQs [12], and Web-based tutorials [15, 18] are popular alternatives to traditional documentation. Also, short instructional videos are increasingly used to document free or low-cost web- and phone-based apps for which traditional documentation could be cost-prohibitive [28]. As summarized by Shachak [32], “software users often share information and offer help to other users through blogs, online communities and discussion forums, instructional videos posted on YouTube, and more” (p. 198).

Possibly the most popular source of help, often preferable to any documentation, is simply asking other people for assistance [16, 37]. For example, Mitchell [21] found that mainframe and UNIX systems software users perceived technical support as a primary source of information. Undergraduate computer science majors, frustrated with in-product help dialog boxes, preferred to ask other people for help or use web search engines, in that order of preference [39]. Web-based technical support is another assistance option that a growing number of vendors are providing [2].

2.4 Software Developers

Although not focused specifically on software documentation per se, much research has been done in the general area of software engineer information behavior, as summarized in [6]. Fidel and Green [4] analyzed three broad areas: types of information sought, information sources, and factors used to select information sources. Studies indicate that engineers rely heavily on colleagues and internal documents as information sources (e.g., [14]). Freund and Toms [8] found that software engineers valued the following information characteristics: topicality, level of specificity, relationship to specific case or scenario, genre, currency, product or technology version, author, and source. A study of software engineers [5] found that software engineers noted these attributes as most contributing to a documents' effectiveness: content, how up-to-date it is, availability, and use of examples.

Relationships between software engineers' work-tasks and document genres used have been observed in past research [9, 23]. Freund [7] developed a genre taxonomy of core information genres used by software engineers and found that the genres' perceived usefulness varied by the engineers' task types.

Montesi & Navarette [23] found that a software engineer's search behavior for technical documentation may change based on the software technology used. Whereas a vendor's product-embedded documentation served the engineer's needs and obviated the need to go online for help, his company's switch to open source technology forced him to consult mostly online sources of help, including other vendors' help systems, informational websites on the technology of interest, and news and discussion groups. Freund [6] reports similar findings. Both also reported differing information use over the phases of a project life cycle.

Freund [6] associated software engineers' differing use of genre over a set of information tasks (learning about something, deciding between alternatives, carrying out a task or process, fact-finding, and problem-solving) and over a set of software engineering work tasks (architecture and design, implementation, deployment, installation and configuration, integration, migration, performance tuning and troubleshooting). Work-tasks and genres used also varied by personnel roles such as project manager, architect, and technical specialist.

Li, et al [17] classified help-seeking tasks of software developers during the development process into categories: configuration-oriented, feature-oriented, error-oriented, and API-oriented. They then classified help-seeking strategies for approaching these tasks:

- Use online crowd-sourced knowledge - online code examples, technical blogs, forum discussions, FAQs, search engines, etc.
- Consult formal technical documentation - API specifications, books, technical manuals, etc.
- Develop a problem solution based on previous experience
- Consult experts

Help-seeking behavior varied by task-type, help-seeking strategy, and level of user expertise.

"...using online crowdsourced knowledge is the most commonly adopted strategy for feature-oriented help seeking. For API-oriented help seeking, developers prefer the most formal technical documentation. To fix errors, developers prefer to use online crowdsourced knowledge or solve the problems based on their previous experience. None of our participants seek help in formal technical documentations for fixing errors. Technical documentations are usually designed for correct usage scenarios; they may offer little help in dealing with erroneous scenarios. For configuration-oriented help seeking, developers prefer to use crowdsourced knowledge and technical documentations." (p. 146)

However, the developers studied were graduate students, as opposed to professional software engineers, and as the authors point out, "Further studies are required to generalize our findings with professional developers, industrial systems and real software engineering tasks" (p. 151).

The two studies that most closely align with our current research are over twenty years old [21, 22]. The first study involved corporate system programmers, application programmers and network managers on four platforms (PC, UNIX, mainframe, midrange) in the US and Europe. Seventy-two percent of the customers reported that documentation solved their problems most of the time, and 63% were satisfied with their documentation. Mainframe users were significantly more dependent on the documentation than users of the other platforms. An inter-dependent relationship was found between software and documentation satisfaction. A follow-up study [22] compared corporate end users of both "shrink-wrapped" and enterprise vertical applications with the 1993 study's systems software users. The end users liked their software more than the systems software users did but were less satisfied with their documentation, and considered the documentation to be less important.

2.5 Improving the User Experience

Software vendors have traditionally approached documentation as a closed system, assuming that workers use only company-supplied materials. Spinuzzi and Zachary [35] have argued that "all documentation systems are open-ended because users inevitably import ad hoc, unofficial genres in to the genre ecology to help them mediate their work" (p.180). They advocate that vendors take an open systems approach "recognizing that human interactions with complex technologies are inevitably mediated by dynamic and unpredictable clusters of communication artifacts and activities" (pp. 170-171).

Spinuzzi [34] describes how this approach would affect the role of technical communicators:

"In the same way, when we design new online information and new documentation, we should do so knowing the activities in which the users engage and the resources (genres) they draw upon. And we should consider that the success of our efforts rests on how well the efforts fit with the rest of the network - how well they support the users' many activities and how well they make use of familiar genres. Does our documentation fit into the ecology of genres? Are there ecological niches to be filled? Such an approach decenters the writer, changing the writer's role from that of "author" to that of "coauthor," a collaborator

who helps to facilitate users' endeavors, refines their innovations, and identifies points for future innovation." (p. 21)

Virtaluoto [38] agrees that the role of technical communicators must change:

"User-centeredness is widely recognized as one of the main quality factors in technical communication, but the current work processes of the field do not allow technical communicators access to users or user data...A new model for technical communication is required..." (p. 38)

Many organizations have incorporated these ideas into their practices. Postava-Davignon, et al. [30] found that having documentation writers observe documentation testers using the products "enriched their understanding of how customers use documentation to accomplish real tasks" (p.36). They also report the value of employing usability experts in the pre-deployment documentation process. Chilana, et al. [3] suggest a greater role for usability experts in the post-deployment phase. By working more closely with software support teams, usability professionals can obtain a greater understanding of the processes by which usability is maintained after deployment. Pierce [29] describes how to improve corporate end user documentation by managing relationships with corporate customers in order to obtain feedback on current and proposed documentation.

3. RESEARCH QUESTIONS

The basic research questions that drive our analysis are:

1. Generally speaking, what genres do software users tend to consult in order to acquire information? And more specifically, what genres do users of the IBM Rational software products consult?
2. How significant are the differences related to role and overall experience with the software? Do beginning users tend to have different genre preferences than experienced ones?
3. Since the user goal is not to acquire material of a certain genre but to fulfill a task, how important is genre to content selection?
4. What is the relationship between the genres that users say they prefer and the genres they actually use?

4. METHODOLOGY

At the 2014 IBM Voice of the Customer (VoiCE) event, held between 31 May and 1 June 2014, members of the IBM Rational documentation group conducted a survey of existing Rational product users. The Rational division of IBM produces a variety of software products for enterprise customers to use in large-scale software product development and project management.

Typical VoiCE participants are in leadership positions within their enterprise business units: senior software developers, administrators, and architects. The survey was announced during the keynote address at the meeting, distributed on chairs during the luncheon that followed, and collected afterward.

Seventy-four individuals completed the survey. Two surveys completed by IBM employees were removed from consideration because of affiliation with IBM. This pool of respondents was a convenience sample of conference attendees and is not necessarily a representative random sample of Rational product users.

5. SURVEY RESULTS

Because of the small subsets of users compared, our results generally suggest trends, as well as opportunities for follow-up research, rather than examining statistical significance. Not all of the survey questions provided results that were relevant to this paper. The relevant survey questions, and any options provided to the respondents, are discussed in the respective results sections.

5.1 Analytical Perspectives

Several survey questions address our research questions by providing bases for differentiating and comparing results among subsets of the survey respondents. We compare the respondents in three ways: product type used, duration of product use, and role in using the products.

5.1.1 Product Type

The introductory questions asked: "What product do you use most frequently" and "What other Rational products do you use?" We consider the responses to reflect the users' primary and secondary products: primary products are the ones used most frequently and secondary products are the "other" products mentioned. The respondents (n=71) reported using 24 different primary products. Thirty-nine percent (n=28) of participants specified multiple primary products although the question only asked for one. Respondents (n=59) reported using 40 different secondary products. Because of the wide array of products reported, we considered only the primary products. To simplify the data analysis, we grouped the products into three categories:

- *Growth products* are relatively new and have expanding user bases. Software and documentation undergo frequent changes.
- *Mature products* have been in production for multiple years and have a stable user base. Due to the popularity of the products, the software and its documentation are actively maintained, but major changes are rare.
- *Legacy products* are still in active use but not actively sold. Changes to the UI, code, or documentation are rare and usually limited to bug fixes.

The majority of respondents indicated either mature or growth products as ones they use most frequently. Our analysis focuses on comparisons between these two groups. The complete data set also includes a group of "other" product users, who indicated some combination of growth, mature and legacy products. Forty-five percent (n=32) use mature products, 31% (n=22) use growth products, and 24% (n=17) use "other" products.

Table 1: Role groupings for analysis

Grouping	Listed roles	Responsibilities
Administrator	Installer Administrator	Configure and maintain large multi-user systems
Architect	Architect	Design configurations, systems, and components
Stakeholder	Stakeholder Manager Other	Supervise or track projects that use the designated software products
User	Developer Tester Analyst Operations Specialist Systems Engineer	Use the software for its designated purpose as part of their everyday job

5.1.2 User Roles

Q1 asked “What is your primary role in using the product?” The survey presented ten user role categories based on standard IBM task analysis. When we analyzed the survey results, we found it was preferable to combine the roles into four categories based on similar responsibilities, as shown in Table 1. While Q1 requested a single primary role, 44% (n=32) of respondents (n=72) specified multiple roles. Combining roles into groups reduced the number of users who reported multiple roles to 35% (n=25).

5.1.3 Duration of Product Usage

Q2 asked “How long have you used the product?” The options were less than 3 months, 4-6 months, 7-12 months, between 1 and 3 years, more than 3 years. Only 4% (n=3) used the products for less than a year, 20% (n=14) used them for 1-3 years, and 76% (n=55) used them for over 3 years. Because of the very small number of beginning users, we have designated newer users as those who have used the products for fewer than three years and experienced users as those who have used the products longer.

5.2 Genre Usage

Q5 asked “How often do you use content in the following formats?” Users were asked to say if they used formats “Never, less than monthly, every month, every week, or every day.” Table 2 lists the formats. Although we use the term genre throughout this paper, the word “format” was used in the questionnaire supplied to the research participants, as being a more familiar term in their domain of expertise.

Table 2: Genres

Genre	Brief description
Product help system	Vendor-supplied, warranted product documentation
Tutorials	Step-by-step instruction on a specific task set
Samples	Working examples of code or data to use with the product
Descriptive videos	Videos that introduce or describe the product in general terms, often produced by Marketing
How-to videos	Videos that provide a step-by-step walk-through of a task or task set
Descriptive articles	Articles that introduce or describe the product in general terms, often produced by Marketing
How-to articles	Articles that describe or explain specific tasks or task sets
Tech notes	Vendor-supplied notes on product upgrades and bug fixes.
Forums	Interactive question-and-answer web sites that address product issues
Blogs	Web sites that publish periodic short articles on a given subject

The results of Q5 are shown in Figure 1. The frequencies were converted to cumulative measures of daily, at least weekly, at least monthly, and total users.

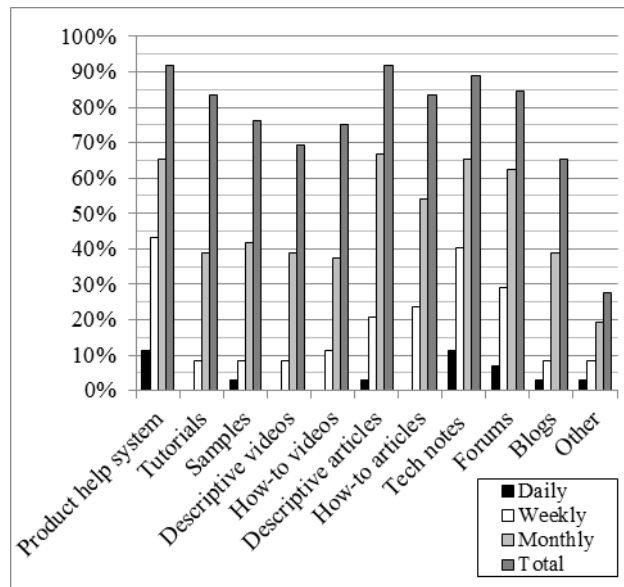


Figure 1: Frequency of Usage by Genre (n=72)

Overall, all genres were consulted by at least 65% of users. However, few users consult documentation of any sort on a daily basis. For this reason, we can consider weekly to be regular usage and monthly to be occasional usage. All genres were consulted at least monthly by 38% of the users. Overall, the five most used genres, both monthly (ranging from about 55-77% of users) and weekly (ranging from about 20-40% of users) were product help, Tech notes, forums, how-to articles, and descriptive articles.

Q5 is instrumental in answering our research questions about the genres used to acquire information and the extent to which product type, experience, and role influence genre selection.

5.2.1 Genre use by product type

Figures 2 and 3 show occasional and regular use of the different genres, segmented by product type used.

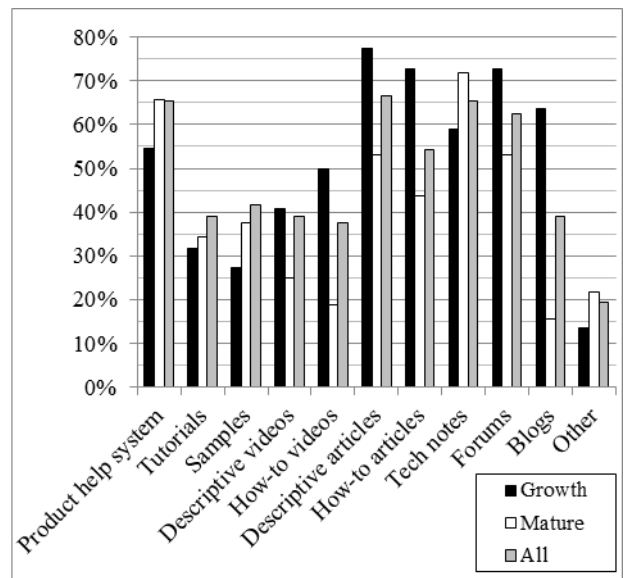


Figure 2: Occasional use, by product category (Q5)

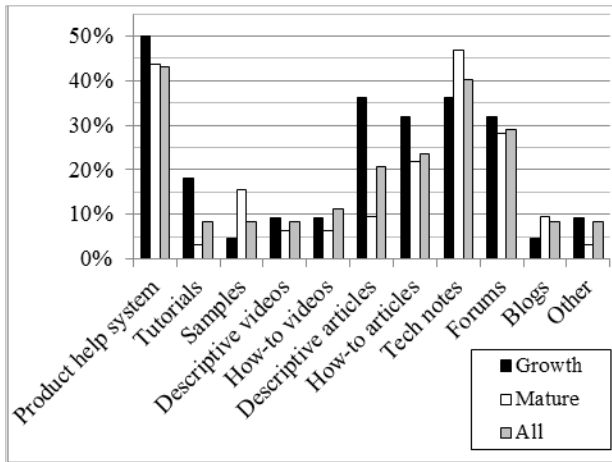


Figure 3: Regular use, by product category (Q5)

- All genres were used occasionally by at least 25% of the growth product users and by at least 15% of the mature product users.
- Regularly and occasionally, growth product users are more likely than mature product users to use descriptive articles.
- Growth product users are more likely than mature product users to use blogs and how-to videos, at least occasionally. Despite the relatively small number of respondents in our sample, the difference in monthly blog usage was highly statistically significant. A two-tailed, Fisher's exact test showed $p=0.0001$. The odds ratio, showing effect size, was 11.6, with a 95% confidence interval of 2.7-54.8 [19].

5.2.2 Genre use by duration of product use

Figures 4 and 5 show occasional and regular use of the different genres, segmented by duration of product use.

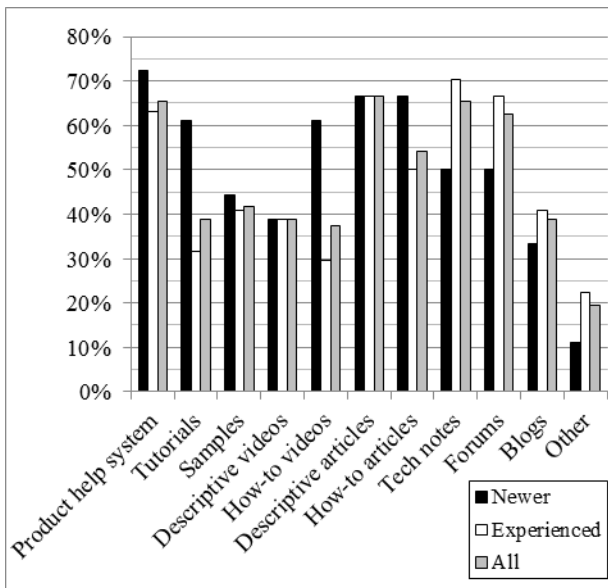


Figure 4: Occasional use, by experience level (Q5)

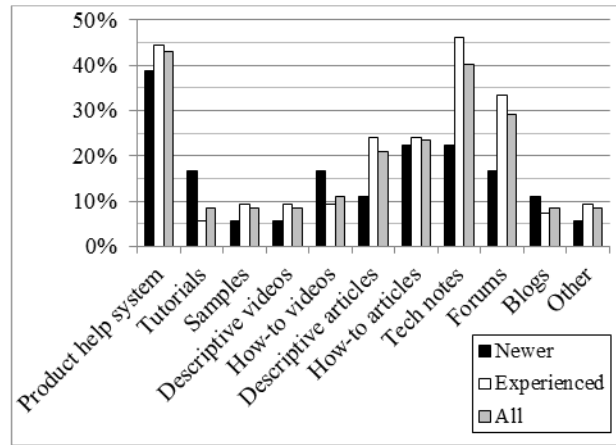


Figure 5: Regular use, by experience level (Q5)

- For occasional use, tutorials and how-to-videos were much more popular with the newer users. More experienced users favored Tech notes and forums.
- Regular usage was lower for both groups, with small differences between the groups, with the exception that the more experienced again favored Tech notes and forums.

5.2.3 Genres use by respondent role

Figures 6 and 7 show occasional and regular use of the different genres, segmented by respondent role. In this section, "users" refers specifically to those in the role category of user (see Table 1). The following graphs reflect the fact that 35% of users surveyed fell into multiple roles. Their reported genre usage was counted for each of the roles. (See the Discussion section for the implications of this.)

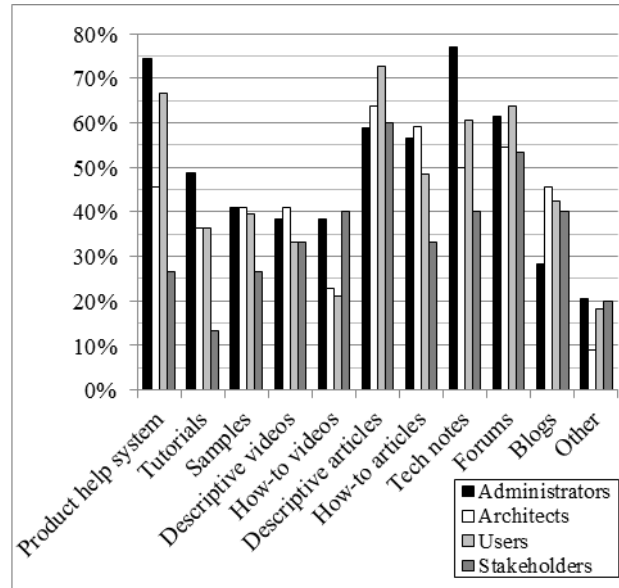


Figure 6: Occasional use by role (Q5)

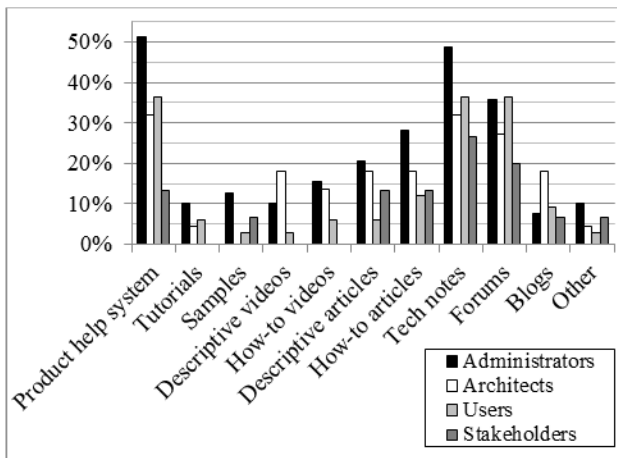


Figure 7: Regular use, by role (Q5)

- At least monthly, all genres were consulted by at least some individuals in all roles.
- Product help and Tech notes were regularly consulted more often than other genres, with almost 50% of administrators reporting regular use. Forums were the third most regularly used genre.
- Administrators used the widest variety of genres regularly. For occasional use, most administrators consulted product help and Tech notes, with over half of them also using descriptive articles, how-to articles, and forums. Just under 50% used tutorials occasionally as well.
- Over 70% of users consult descriptive articles on an occasional basis. Product help, Tech notes, and forums are the genres most consulted regularly by users, each by about 30% of the users.
- Genres most used by architects on a regular basis were product help, Tech notes, and forums, each by about 30% of the architects. All genres except how-to-videos were used occasionally by at least 35% of the architects.
- On a regular basis, stakeholders use a narrower range of genres than the other roles do and are most likely to use Tech notes and forums (25% and 20% respectively). Sixty percent use descriptive articles occasionally. Overall, few report using tutorials.

5.3 Overall Product Satisfaction and Accessibility of Product Information

Next, we look at respondents' overall satisfaction with the software, and compare that to their satisfaction with the ease of finding needed information about the software.

Q3 stated "Rate how well this product meets your needs in getting your work done," and users selected 1-5, where 1 = not at all and 5 = excellent. Q4 asked "How easy is it to find the information you need for your product?" and users responded with 1-5, where 1 = difficult and 5 = easy. As shown in Figure 8, the 70 respondents expressed an overall positive opinion of the product, but the 72 respondents were less positive about the ease of locating product information.

Comparing the results of Q3 to Q4, 35% assigned the same rating to the products and the ease of finding information, 60% assigned a higher rating to the product, and 6% assigned a higher rating to the ease of finding information.

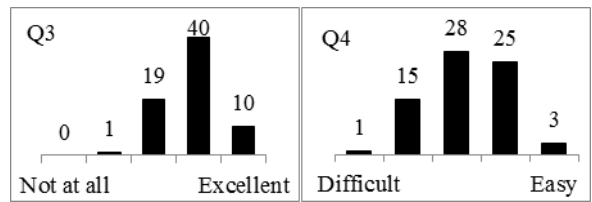


Figure 8: Product satisfaction (Q3) and info. findability (Q4)

When we factor the responses to Q4 by our criteria for comparison, as shown in Figure 9, it is clear that newer users have more difficulty locating the information they need. Growth product users were also slightly more likely to have difficulty locating information for their product. This may be partially due to the significant proportion of growth users that were also newer users.

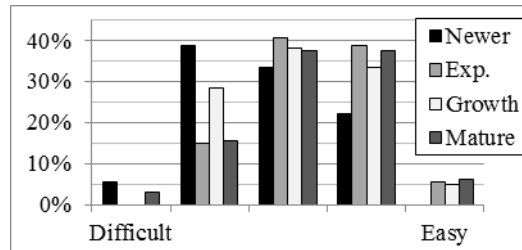


Figure 9: Product information findability by category (Q4)

5.4 Importance of Genre

Q8 asked "How important to you is the format of the information?" Users selected a value from 1-5, where 1 = unimportant and 5 = very important. As shown in Figure 10, users generally considered genre to be important.

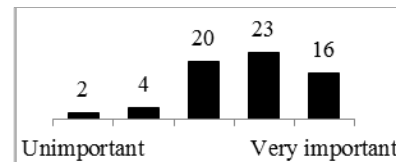


Figure 10: Importance of Genre (Q8, n=65)

Very few users found the genre of information to be unimportant, no matter their experience level or product type. Mature product users were more likely to be neutral to genre, but few ranked it as unimportant, as shown in Figure 11. Additionally, newer and growth product users were more likely to find format very important.

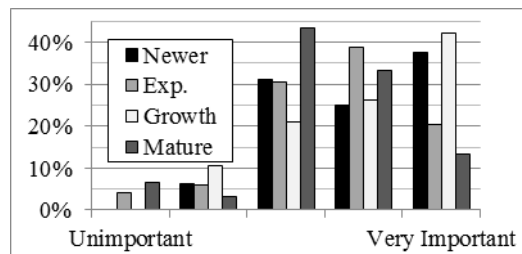


Figure 11: Importance of Genre (Q8)

Q6 asked "Which of these information formats do you prefer to use?" Out of 65 responses, 34% provided multiple answers. Nine percent (n=6) provided an answer that was not a documentation genre, which were removed. (Four of these involved web searches.) In total, the 59 valid respondents provided 75 different

preferred genres. These responses are shown in Figure 12. Unfortunately, the numbers are too small to provide a meaningful, further breakdown by product type or user experience level.

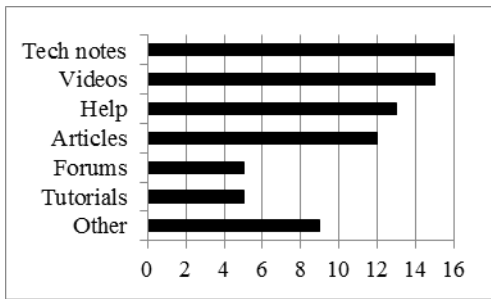


Figure 12: Preferred Formats (Q6)

6. LIMITATIONS

At this point, we would like to emphasize that given the relatively small number of respondents, the small sizes of the sub-groups being compared, and the self-selection bias involved in surveying conference attendees, this is an exploratory study. Our hope is to identify effects that can be verified in the future.

Secondly, we want to acknowledge the unique characteristics of the user population studied here, especially in comparison to those of the large body of documentation studies that have been conducted in recent decades. The documentation users here are software developers using a wide variety of systems development software produced by one large company. Again, to be clear, it is not about them using the documentation of the software they are developing (although there is a large body of research on this topic). The users here are consulting documentation for software that they are using to produce other software systems. Thus, the users, the software, and the tasks involved are somewhat different from those in much of the past documentation research.

One further observation about the sample is that the venue for collecting data had an impact on the mix of roles reported. As mentioned earlier, the conference participants tended to be senior employees in leadership positions, which means that architects and stakeholders are over-represented and users are under-represented (see Table 3 for a breakdown of survey respondents by role). A typical corporate software system would have a far greater number of users than administrators or architects.

Another limitation worth mentioning is that the survey respondents were not provided with a list of genre definitions, only the genre name as indicated in the Results section. Although it was assumed they would be familiar with the genres, this assumption may have affected the accuracy of their responses. For example, some respondents may have had trouble distinguishing between the two types of videos or the two types of articles.

7. DISCUSSION

Overall, few users reported that documentation genre in general was unimportant to them. There was a strong user preference for product help and Tech notes, relative to the other genres. This result speaks to the importance of vendor-supplied documentation for these users. This study does not explicitly address the question of the relative desirability of vendor-supplied versus alternatively-sourced documentation, given that many of the genres studied could be either (for example, blogs or articles). However, for these users, the most frequently accessed genres, product help and Tech notes, are always vendor-supplied.

Overall documentation use by our respondents seems somewhat low, at least compared to other studies with different users, software and tasks (e.g., [33]). Over a third of our users said they consulted documentation less frequently than weekly. That leads to an interesting question – are these users not having problems, or are they attempting to solve them in some other way [1]? Our data cannot answer that. The survey did not inquire about personal contacts or technical support as a source of assistance. However, it is important to note that, because of the low amount of daily and weekly usage reported, the differences we see among groups of the users are mostly based on usage less frequent than weekly.

Consistent with the literature [33], respondents with less experience with the software were more likely to access documentation and tended to use different genres than more experienced users. Tutorials and how-to-videos were used by a greater percentage of these respondents, although they tended to be used relatively infrequently. This makes intuitive sense because once something is learned, the documentation is not needed. Newer users also tended to use Tech notes and forums less. A possible explanation is that a certain level of sophistication regarding product knowledge may be necessary for one to make effective use of this type of information. As in Mitchell [22], newer users reported having more difficulty finding information than other users. Newer users also reported that documentation genre was of more importance to them.

Similar to Montesi and Navarrete’s findings [23], the type of software product used seemed to have a pronounced effect on the documentation genre used. More users of software in the growth category reported consulting articles, videos, forums, and blogs than did the users of mature software. This could be related to characteristics of the products themselves. In comparison to growth products, mature products are more stable from release to release and tend to have fewer new concepts and features to understand. Users of mature products may have more existing knowledge to build on and mainly need the usage details found in the product help and Tech notes.

On the other hand, growth products change more from release to release, may introduce novel software concepts, and regularly add new features. It is more likely that users will need the “big picture” available in articles and videos, as well as practical advice on the new features from forums and blogs. This suggests that understanding a newer product can call more diverse content genres into play. For example, an unexpected finding was that the growth product users were 11 ½ times more likely to consult blogs than the mature product users. This finding could prove valuable if corporate management questions the expense of paying personnel to maintain a blog for these products.

A possible confounding factor, in the differing genre usage patterns between mature and growth product users, is the fact that 84% of users of the mature software in our sample also had 3 or more years of experience with the software as compared to 59% of the growth software users in our sample. In other words, our sample of growth product users contained a higher proportion of newer users than did the sample of mature product users.

Other questions that did not factor into our study are whether users of growth software simply prefer these genres or whether these genres are just more available for growth products. The issue of documentation preference versus availability is an interesting one for future research.

Consistent with Freund’s findings [6], job role had an effect on genres used. More administrators regularly used a wider variety of genres than those in the other roles. This makes sense, as

administrators solve a wider variety of problems and require a more holistic understanding of the system. On the other hand, few stakeholders use any of the genres regularly, as one would expect given that they are not involved directly with technical aspects of systems development. The disproportionate reliance of both administrators and users on the help system and Tech notes underscores the usefulness of these two genres for individuals who perform everyday technical activities with the software.

Regarding analysis of the data by job role, we discovered that collecting role data is problematic in that so many respondents reported multiple roles. Even after consolidating role categories on the survey, 35% of respondents fell into multiple roles. If their genre usage varies by role, respondents may be unable to separate their mind spaces by role when answering survey questions. If one is both an administrator and an architect, we have no way of knowing which genres they use in which role. To more fully understand the impact of multiple roles, we broke down each role grouping by whether the respondents performed a single role or multiple roles. Because of the large number of overlapping roles, we counted users who reported any one of the four role categories as belonging to that role.

Table 3: Respondents with multiple roles

Roles	Total	Single role	Multiple roles
Administrator	39	18	21
Architect	22	5	17
User	33	12	21
Stakeholder	15	10	5

A large percentage of stakeholders reported only that single role. And enough administrators and users reported a single role to indicate clear differentiation. However, most of the architects have other roles, so it's difficult to draw conclusions about their genre usage. For future investigation of documentation genre use by work role, perhaps a more time-intensive personal interview process, such as that in [6], would elicit a clearer picture.

8. SUMMARY AND CONCLUSION

The research looked at documentation use by technical customers of a large global software vendor. Survey respondents used a variety of documentation genres, both vendor-supplied and alternatively-sourced. The value of vendor-supplied documentation was confirmed across the board, as in-product help and Tech notes were the most widely, and heavily, used sources. Forums, descriptive articles, and how-to articles also saw regular usage. However, certain sub-groups of users also depended on other genres: for example newer users and tutorials and users of growth software products and blogs.

The importance of context to the selection of genres used was affirmed, as usage was found to vary by user experience level, software product type, and job role. This speaks to the challenge of technical communicators to produce documentation to meet the needs of users in diverse contexts, and also affirms the need for a healthy mix of content in different genres.

Broader studies are needed to confirm and clarify these results and also address further questions that this study raised but could not address, such as how does usage vary over the duration of a project lifecycle? What is the relationship between the use of vendor-supplied and alternatively-sourced documentation? How can vendors best produce documentation to complement the alternatives? The answers to these questions would provide valuable input to help technical communicators design and produce the best documentation possible.

While this study focused at genre *usage*, it garnered insufficient data regarding genre *preference*. Although usage can be a proxy for preference, it does not tell the whole story. A developer may use genre A, while not preferring it. Maybe genre B either could not be found or did not exist for this product. This more detailed level of understanding would further help content strategists plot the best mix of genres to enhance product communications.

Finally, the literature alludes to an ever-changing world for technical communicators: an increasing demand for greater usability, the explosion of alternative sources of documentation on the internet, and even the ease of outsourcing tasks globally, for example. Thus, technical communicators may find themselves competing with usability experts, alternative documentation sources, and cheaper labor from other countries. One response at IBM is the creation of the role of Social Media Curator, a role that takes stock of non-vendor documentation, such as forums and blogs. The role attempts to weave a coherent overall picture of the product's documentation, in order to meet the needs of customers who use alternative documentation sources and, hopefully, to increase the usability of the product at the same time. This one example highlights the importance of understanding customers' documentation genre usage. As customers' documentation consumption patterns continue to change, so will the role of technical communications personnel.

9. REFERENCES

- [1] Ceaparu, I., Lazar, J., Bessiere, K., Robinson, J., and Shneiderman, B. Determining causes and severity of end-user frustration, *International Journal of Human Computer Interaction*, 17(3), 333-356, 2004.
- [2] Chilana, P.K., Grossman, T., and Fitzmaurice, G. Modern software product support processes and the usage of multimedia formats. *CHI '11*, 3093-3102.
- [3] Chilana, P.K., Ko, A.J., Wobbrock, J.O., Grossman, T., Fitzmaurice, G. Postdeployment usability: A survey of current practices. *CHI'11*, 2243-2246.
- [4] Fidel, R. and Green, M. The many faces of accessibility: engineers' perception of information sources, *Information Processing & Management*, vol. 40, pp. 563-581, 2004.
- [5] Forward, A. and Lethbridge, T. C. The relevance of software documentation, tools and technologies: a survey. In *Proc. ACM Symp. on Document Engineering*, pages 26–33, 2002.
- [6] Freund, L. Contextualizing the information-seeking behavior of software engineers. *Journal of the American Society for Information Science & Technology*, doi: 10.1002/asi.23278, 2015.
- [7] Freund, L. A cross-domain analysis of task and genre effects on perceptions of usefulness. *Information Processing & Management*, vol. 49, 1108–1121, 2013.
- [8] Freund, L. & Toms, E.G. Enterprise search behavior of software engineers. In *2006 ACM SIGIR*, 645-646.
- [9] Freund, L., Toms, E. G., & Clarke, C. L. A. Modeling task–genre relationships for IR in the workplace. In *2005 ACM SIGIR conference*. Salvador Brazil.
- [10] Garousi, G., Garousi-Yusifoglu, V., Ruhe, G., Zhi, J., Moussavi, M., Smith, B. Usage and usefulness of technical software documentation: An industrial case study, *Information & Software Technology*, 2015, 664-682.

- [11] Gottipati, S., Lo, D. and Jiang, J. Finding relevant answers in software forums, in Proceedings of the Automated Software Engineering Conference, 2011.
- [12] Henß, S., Monperrus, M., Mezini, M. Semi-automatically extracting FAQs to improve accessibility of software development knowledge, Proceedings of the 34th International Conference on Software Engineering, June 02-09, 2012, Zurich, Switzerland
- [13] Hendricks, R. Feature guides: improving usability of end users. Proceedings of 2003 ACM SIGDOC, 155-159
- [14] Hertzum, M. and Pejtersen, A. M. The information-seeking practices of engineers: searching for documents as well as for people, *Information Processing & Management*, vol. 36, pp.761-778, 2000.
- [15] Lafreniere, B., Bunt, A., Lount, M., and Terry, M. Understanding the roles and uses of web tutorials. In Proceedings of the 2013 International AAAI Conference on Weblogs and Social Media, AAAI, 303–310.
- [16] Lee, D.S. Usage patterns and sources of assistance to personal computer users, *MIS Quarterly*, 10(4), 313-325, 1986.
- [17] Li, H., Xing, Z. Peng, X., and Zhao, W. What help do developers seek, when and how?, in Proceedings of the Working Conference on Reverse Engineering (WCRE), pp. 142–151, IEEE, 2013.
- [18] Lount, M., and Bunt, A., Characterizing web-based tutorials: Exploring quality, community, and showcasing strategies. In Proc. SIGDOC 2014.
- [19] McHugh, M. L.. The odds ratio: calculation, usage, and interpretation. *Biochemia Medica* 2009;19(2):120-6.
- [20] Mehlenbacher, B. Documentation: not yet implemented, but coming soon The HCI Handbook: Fundamentals, Evolving Technologies, and Emerging Applications (pp. 527-543): Routledge, 2003.
- [21] Mitchell, G. What do users really want from computer documentation? Proceedings of IPCC 93, Philadelphia, PA, October, 1993, 27-31.
- [22] Mitchell, G. Shrink-wrapping the formula for better information: End user vs MIS computer documentation preferences,” in Proc. IEEE Int. Professional Communication Conf. (Banff, Alta., Canada, 1994), pp. 361–365
- [23] Montesi, M., & Navarrete, T. Classifying Web genres in context: A case study documenting the Web genres used by a software engineer. *Information Processing & Management*, 44, 1410–1430, 2008.
- [24] Novick, D., Elizalde, E., and Bean, N. Toward a more accurate view of when and how people seek help with computer applications, Proceedings of SIGDOC 2007, El Paso, TX, October 22-24, 2007, 95-102.
- [25] Novick, D., and Ward, K. What users say they want in documentation Proceedings of SIGDOC 2006, Myrtle Beach, SC, October 18-20, 2006, 84-91.
- [26] Novick, D., and Ward, K. Why don't people read the manual? Proceedings of SIGDOC 2006, Myrtle Beach, SC, October 18-20, 2006.
- [27] O'Malley, C., Smolensky, P., Bannon, L., et al. A proposal for user centered system documentation. In Proc. CHI '83, ACM (1983), 282-285.
- [28] Pflugfelder, E. H. The minimalist approach to online instructional videos, *Tech. Commun.*, vol. 60, no. 2, pp. 131–146, 2013.
- [29] Pierce, R., Using customer input to drive change in user assistance, SIGDOC '08, pages 23-30
- [30] Postava-Davignon, C., Kamachi, C., Clarke, C., & Kushmerek, G. Incorporating usability testing into the documentation process. *Technical Communication*, 51, 36-44, 2004.
- [31] Rosso, M. User-based identification of Web genres. *Journal of the American Society for Information Science & Technology*, 59(7), 1053-1072, 2008
- [32] Shachak A., Dow, R., Barnsley, J., Tu, K. Domb, S., Jadad, A.R., and Lemieux-Charles, L. User manuals for a primary care electronic medical record system: a mixed methods study of user- and vendor-generated documents. *IEEE Transactions on Professional Communication*, 56, (3), 194-209, 2013.
- [33] Smart, K., Whiting, M., and De Tienne, K. Assessing the need for printed and online documentation: A study of customer preference and use, *Journal of Business Communication* 38(3), 285-314, 2001
- [34] Spinuzzi, C. Grappling with distributed usability: A cultural-historical examination of documentation genres over four decades. SIGDOC '99: Proceedings of the 17th annual international conference on computer documentation, 16-21.
- [35] Spinuzzi, C. and Zachry, M. Genre ecologies: An open-system approach to understanding and constructing documentation. *Journal of Computer Documentation*, 24 (3). 169-181, 2000.
- [36] Tomasi, M. D., & Mehlenbacher, B. Re-engineering online documentation: Designing examples-based online support systems. *Technical Communication*, 46 (1), 55-66, 1999.
- [37] van Loggem, B. E. Nobody reads the documentation': true or not? In Proceedings of ISIC, the Information Behaviour Conference, Leeds, 2-5 September, 2014:
- [38] Virtualuoto, J. “Death of the Technical Communicator”—Current Issues and Future Visions for our Field. *Technical Communication*, 61 (1), 38-47, 2014.
- [39] Welty, C. J. Usage of and satisfaction with online help vs. search engines for aid in software use. SIGDOC'11. ACM, New York, USA, 203-210.
- [40] Yates, J., and Orlikowski, W. J. Genres of organizational communication: a structural approach to studying communication and media. *Academy of Management Review*, vol. 17, pp. 299-326, 1992.
- [41] Zachry, M. Constructing usable documentation: A study of communicative practices and the early uses of mainframe computing in industry. In ACM SIGDOC '99 Proceedings, 22-25