Creating Technical Documentation for Digital Natives

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Abstract

In the digital age, people are spending more time reading online and have new expectations for how they access information. With people reading more shallowly than ever before, how we access and think about information is changing at a rapid pace. Accompanying these changes, two distinct groups of people are forming: digital immigrants and digital natives. These two groups of people have different expectations when it comes to accessing and using information. As the world moves towards becoming predominantly comprised of digital natives, how companies think about their technical communication strategy needs to evolve. This study asks the question, how does technical communication need to evolve to meet the needs and expectations of digital natives? To investigate this, I analyzed several new forms of technical documentation, specifically video tutorials and forums, and surveyed 21 digital natives on how they use different forms of technical documentation in their day-to-day lives to solve problems. The goal was to assess their expectations and needs and explore viable options for technical documentation in the future.

Introduction

In the digital age, accessibility and effective design of technical documentation have never been more important. Because people are likely now more than ever to access informational texts on the web and mobile devices, ease of use and scan-ability have become paramount concerns. Many websites have adopted conventions that promote scan-ability and ease of use, and these are the conventions that people have become accustomed to as they access the majority of their information on the web. While these design principles can be applied to document design of written texts, the web provides many other affordances that cannot be replicated with a strictly text and image based PDF or printed manual. These affordances, which include audio, video and social interaction, cannot be easily integrated into traditional text and image based technical documentation.

While including audio, visual and social interaction of technical documentation may seem trivial; these modes are increasingly integrated into how people obtain technical information about products and companies. Technical writers need to begin to integrate these forms of media and

begin to re-imagine technical documentation, including the technical manual, as a new generation of users emerges.

This new generation of users, also called “digital natives,” grew up immersed in a world where technology and the internet were integrated into daily life. Marc Prensky, a writer and speaker on learning and education, first coined the terms “digital native” and “digital immigrant” in his article “Digital Natives, Digital Immigrants” (Prensky, 2001, p. 1). Born between 1980 and present day, digital natives are adept in the vocabularies of the web and are able to easily use different technologies. Digital immigrants learned how to use these technologies and languages later in life, and still retain a bit of an “accent” of a pre-web world, such as printing off e-mail or a PDF. The stark differences between how digital immigrants and digital natives interact with technology has shaped how they process information and learn. Up to this point, the primary user base for all technical communication has been comprised of digital immigrants. Due to the differences in familiarity with technologies, the two generations have different expectations when it comes to accessing information. Because users form opinions of companies and products based on how easily they can access and use information, catering technical documentation to digital natives will become important for companies as they strive to reach new audiences and expand. We are moving to a society that is primarily comprised of digital natives and understanding their needs and how they process and engage with information is very important. Because of advancements in technology and changes in society, the ways in which technical writers think about and produce technical documentation needs to evolve beyond the traditional technical manual for future generations. Technical documentation, including the technical manual, is no longer viable as originally imagined.

The ways in which companies produce technical documentation for products needs to extend beyond the text and image based manual. Technical documentation now needs to have several components in order to offer a complete solution for users. Technical documentation for a product must include at the very least a printed manual, with an easily accessible digital version, instructional videos and a company sponsored forum where users can interact with each other and the company to resolve issues. To investigate this need, I looked at the beginnings of the field: where we have started and how far we have come. I then investigated how the internet has

changed how we think and process information, specifically how users now interact with texts. I then explored how digital natives use information as well as the skills and expectations that they have.

How has Instructional Technical Documentation Evolved?

The Early Days

To look at where the field is going in the future, it is beneficial to look at where it started and how far it has come. Technical writing had been taught in colleges and universities in the United States from the middle of the 1800's, but it truly emerged as a professional field during World War II in the 1940's. World War II was widely considered to be the first technological war because many new militaristic technologies were developed and used. With these new and groundbreaking technologies, detailed documentation was essential for proper operation and maintenance.

Technical writers created instructional manuals and documentation, which, like today, were seen as the bridge between the engineers (experts) and the public (novices) who had limited insight into how products worked. In 1968, Thomas Walton wrote a book, *Technical Manual Writing and Administration*, which was among the first books on how to write technical documentation. Thomas Walton was a Manager in the Technical Data Department at TRW systems, which manufactured aerospace and automobile technologies. Because he worked in such an innovative industry, coordination of technical documentation was very important. In *Technical Manual Writing and Administration*, he described technical manuals as "tools" (Walton, 1968, p. 1) and that "These tools provide various means by which the user can accomplish a difficult task even through his training and experience may not fully qualify him for the particular job. In other words, technical manuals help to increase the capability of the user" (Walton, 1968, p. 1). Much like today, technical writers focused on the user, and the text served as a conversation to both identify and predict what the user would need to know. At this time, technical manuals were mainly comprised of text and images. Other multi-media approaches to technical communication were rarely used because these artifacts were difficult to produce and were not easily accessible.

While Walton spends the majority of his book focused on the development of text and image based communications, he also includes a section on emerging technologies and their potential applications in technical communication. He discusses the need for users to understand technical information faster, especially due to the rapid advancements in space exploration, military and industrial systems, which speaks to the state of the world and technological needs in 1968. In this section, Walton touches on key technologies that technical writers can optimize, focusing specifically on the potential for audio-visual aids. He explores the implications that these emerging technologies have for the field of technical communication, describing how, "They take advantage of the human capability to rapidly assimilate a great deal of data from a picture. When this is accompanied by audio illustration or verbal direction, learning is even more rapid" (Walton, 1968, p. 271). Incorporating audio and visual elements into different types of technical communication is also known as a multimodal approach, because it takes advantage of several methods of communication. A multimodal approach to technical communication has enormous benefits for users as they can process the information in different ways, allowing for additional insight.

While taking a multimodal approach to technical communication has obvious benefits to users, in 1968 there were significant limitations to production. Creating audio and video artifacts had significant production costs and little flexibility for change if the product information needed to be updated. Walton attributes the costs of production as the primary cause of slow progress in the development of audio and visual forms of technical communication. (Walton, 1968, p. 265). He also discusses the inflexible nature of the instructional information produced by these technologies, "When changes are needed, visual aids (for example) do not have the same flexibility as manuals since, in many cases, a completely new film reel must be made at the source due to the technical difficulties involved in cutting and stripping in changes" (Walton, 1968, p. 275). In 1968, producing audio and visual technical communications came at a serious cost. The inflexible nature of the technology and the costs of production significantly limited the creation of these instructional materials. The ability for users to access and use audio and visual technical communications was also a limiting factor, because written texts were easily accessible and did not require additional equipment to use.

Early books on how to write technical manuals as well as articles from the Society of Technical Writers and Publishers (the name of the Society for Technical Communication until 1960) show that technical communicators were interested in using a multi-media approach to engage and inform users through technical communication. From the use of slides, video and audio clips, technical writers have been interested in developing content that helps and engages users. However in the early days of the field of technical communication, the available technologies did not allow for the ease of use and flexibility that technical writer required.

Walton writes, "There is no doubt that great accomplishments lie ahead in the field of audio-visuals. And it will continue to be a fascinating and rewarding field for technical writers. Future strides will certainly be made in the flexibility of programming techniques in visual, audio, readout and printout processes in terms of both language and computer symbology" (Walton, 1968, p. 273). It is clear that Walton understood the implications of these technologies for the future and hoped that the capabilities would change and evolve.

With innovations in personal computing, the internet, and other audio and visual technologies, the future that Walton imagined is here. With new technologies for producing audio and visual communications, the restrictions and limitations that Walton outlined in 1968 no longer apply. Communication is more flexible and can reach new audiences as a result of the internet. With more technologies available and constantly emerging, technical communicators have new fields to write for as well as new technologies to write with. Users can now access writing in different ways and in different contexts with mobile devices, tablets and e-readers. There are more options for consumption of information and writing than ever before.

How has Technology Changed How We Consume Information?

While new technologies have changed and influenced how technical writers create informational texts, they have also changed how people consume information and what they expect to see. Due to the affordability and widespread use of devices (computers, tablets, mobile phones) and the use of social media sites such as Facebook and Twitter, more people are reading than ever before. In his article "Is Google Making Us Stupid?," Nicholas Carr writes, "Thanks to the ubiquity of text on the Internet, not to mention the popularity of text-messaging on cell phones,

we may well be reading more today than we did in the 1970's or 1980's, when television was our medium of choice. But it's a different kind of reading, and behind it lies a different kind of thinking – perhaps even a new sense of self" (Carr, 2008, p.1). Changes in what and how people are reading have created new expectations for how information should be laid out. However, these new expectations and methods involved in information processing have lead to more substantial shifts in our brains.

Digital Texts: A Major Turning Point

The emergence of digital texts is the most recent development in a long history of technological advancements that have influenced how we consume information. In his book, *The Shallows*, Nicholas Carr (2010) investigates the history of technological advancements in reading and writing. He specifically focuses on major moments that changed how readers processed information and how these changes influenced society as a whole. He traces the history of reading and writing from the beginnings of time, by describing the shift from strictly oral communication to the introduction of writing with the Sumerians' use of cuneiform to the use of scrolls in ancient Egypt, Rome and Greece. One of the most notable advancements in this timeline is the shift from scrolls to books. When people read texts on scrolls they would read them aloud, and this practice changed when books became the dominant form of text-production. Because books are smaller and portable, people began to read them to themselves and reading was no longer performed aloud, but silently. (Carr, 2010, p. 66). The shift to silent reading created a ripple effect that affected society in many ways. In education, silent reading and books created a new emphasis on independent learning, as silent reading became a companion to community learning in class. Libraries began to evolve to accommodate the need for silent reading and reference books, such as dictionaries, became important aids. Reading was no longer a communal act, "The development of knowledge became an increasingly private act, with each reader creating, in his own mind, a personal synthesis of ideas and information passed down through the writings of other thinkers. The sense of individualism strengthened" (Carr, 2010, p. 67). The method that people used to access written work altered how they read and interacted with their immediate surroundings and related to others.

The shift in how texts were produced and consumed, even as simple as a jump from a scroll to a book, provided one of the greatest shifts in reading and writing. Today, books and silent reading are so ingrained in our society that we take it for granted. Carr goes further to discuss other notable moments in the history of text production and consumption by discussing the invention of the printing press and, most relevant for today's technical communicators, the invention of computers and mobile devices. The use of computers and mobile devices for reading already has and is continuing to change society as dramatically as the introduction of the book. Digital methods of reading and information processing are significantly altering the way we think and process information.

Today, many people are used to reading short pieces of text on computers and mobile devices. These forms of text can include Facebook posts, Tweets and even more visually oriented texts such as Instagram posts and image messages from the app Snapchat. Buzzfeed (buzzfeed.com) specifically caters their articles to include short captions or sections of text that accompany an image. Even Google searches can count as reading, as users scan for the information that best suits their particular need. While all of these platforms and websites provide people with more information than ever before, readers tend to skim for the most relevant content rather than do a deep reading of every text they encounter. People are reading skimming for information and reading shallowly, despite having a greater depth of content available.

Reading Shallowly

In *The Shallows*, Nicholas Carr also expands upon this phenomenon of reading in the digital age. He discusses how the internet changes how we read and consume information, and how this impacts the structure of our brains, "The ability to skim text is every bit as important as the ability to read deeply. What is different, and troubling, is that skimming is becoming our dominant mode of reading. Once a means to an end, a way to identify information for deeper study, scanning is becoming an end in itself- our preferred way of gathering and making sense of information of all sorts" (Carr, 2010, p. 138). In the digital age, deep reading of any text becomes difficult because the dominant mode of information processing involves skimming sections of text, only looking for information that is needed.

To accommodate these new types of readers, writers have begun to break up their texts and to use other multimedia options to engage readers, specifically on screens. By breaking up the text and making it more digestible for readers, some say that we are "losing the ability to apply ourselves properly to a single task, like reading a book in its entirety or mastering a piece of music on an instrument, with the result that our thinking is becoming shallower" (Tweedie, 2010, p. 1). While many people may have opinions as to whether this is a positive or negative shift, it is shift that is naturally occurring as a result of new reading and writing technologies. This major shift is happening concurrently with the generational shift from digital immigrants to digital natives. With both of these changes happening at the same time, society is poised for significant changes, including in the field of technical communication.

How Do Users Interact with Informational Texts?

Before diving into the specifics of how digital natives interact with texts, we must first explore how people typically interact with documents, because many of the fundamentals are the similar for all users and documents.

Understanding how people read and intend to use a document is very important when writing technical information. In *Techniques for Technical Communicators*, Redish (1993) discusses why readers use informational texts and the habits that they use when they read. She frequently refers to the term "satisficing" which means for readers to read to a point where they are satisfied with what they have found and do not need to explore the text further to achieve their objectives (Redish, 1993, p. 3). Readers typically will stop reading, or set aside a document to read later when they have reached a level where it does not benefit them to go further. This type of reading is typically practiced in instructional technical communication, as users "read to do" instead of "read to learn." Because readers come to the text with a predetermined goal, they are more likely to satisfice because they can stop reading when that goal is accomplished and the task completed. Redish further explains the practice of satisificing when she notes that "They may return to the document later for more information or to try again, which is another reason why helping readers to find what they need quickly is so critical in technical documents" (Redish, 1993, p. 3). Today, readers expect to find the answers that they seek quickly, as they would if they performed a

Google search instead. As technical writers, we need to be aware of these basic expectations of readers and how to best cater to them.

In addition to understanding the expectations that users bring to technical documentation, it is also important to understand the levels of interaction between the user and the document itself. There are several key components to the levels of interaction between these two elements, as outlined in Figure 1.

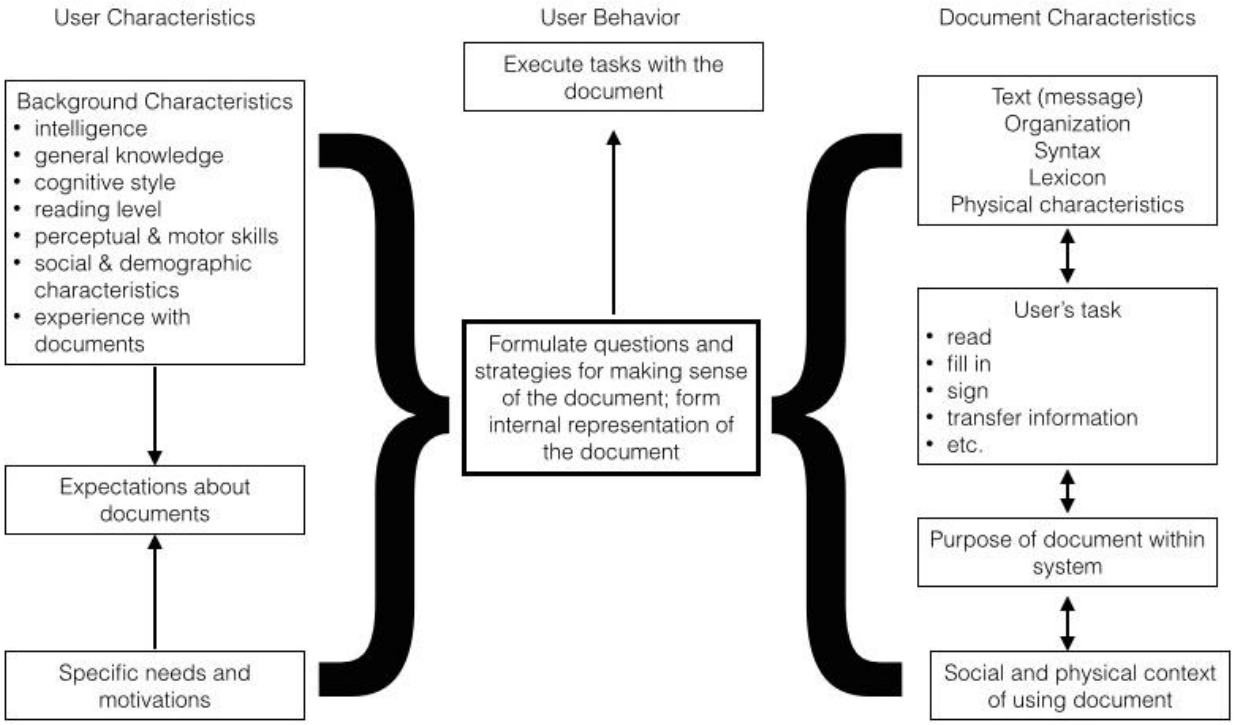

Figure 1: A Model of the Interaction Between Readers and Documents (Holland & Redish, 1982, p. 8).

This figure points out many of the nuanced levels of interaction between users' characteristics, actions and the document's characteristics. While this is an excellent list of interactions that identify the nuances between documents and users, there are many new levels of interaction that have changed since this figure was first created in 1982. Digital texts and experiences with technology affect how readers interact with documents, but this chart is still very relevant today and should be taken into consideration when creating any type of instructional technical communication.

Some updates to this figure should include a familiarity with technology and learning style. A familiarity with different technologies will change how the user relates to the information, and learning style (visual or text based learner) is important in determining which mode for the technical communication works best (video or text). In the user behavior category, the types of devices that the users access technical information are a new consideration. Users have moved past accessing strictly paper documents, and now may be accessing PDFs on computers or other mobile devices. Users may also have access to wifi, or this option may be unavailable. With the possibility that many types of devices could be used, the context and spaces where they are used changes as well. With screens, people may be able to take and use texts different places (smaller or darker spaces) and access other functionalities of the device, such as switching between apps, that weren't previously available. As for document characteristics, users need to understand where instructional texts fit into a larger context, such as a website. They need to understand where to go to get answers, and how the information they seek fits into the larger manual or site to gain access to the information easily. They also need to know the types of multimodal communications available, so that they can cater the information to meet their needs.

How Do Digital Natives Interact with Information?

Digital Natives have qualities and needs, especially when it comes to learning and information processing, that we are just beginning to understand. In his talk, "Capturing the Imagination of the Digital Native" (2008), futurist Craig Bettles describes many of the characteristics that define this generation, in terms of their new skills and preferences for learning and obtaining information:

- Parallel, not sequential thought
- Visual-spatial skills
- Multi-tasking skills
- Response times
- Mental mapping
- Receiving information quickly from multiple sources
- Multitasking and parallel processing
- Pictures, sounds and video before text
- Hyperlinked sources

- Interacting in "real-time"
- User generated content
- Learning that is instant, relevant and fun (Bettles, 2010, p. 10-11).

Digital natives have different needs, and it is important that our society begins to evolve to accommodate these changes in processing and learning, especially in regards to the structure of written communications. Marc Prensky further elaborates on these qualities in *Digital Natives, Digital Immigrants*, where he discusses how digital natives learn and process information. He writes, "Digital Natives are used to receiving information really fast. They like to parallel process and multi-task. They prefer their graphics before their text rather than the opposite. They prefer random access (like hypertext). They function best when networked. They thrive on instant gratification and frequent rewards. They prefer games to 'serious' work" (Prensky, 2001, p. 2). In this context, satisficing, as Redish outlined earlier, takes on a new importance as users combine parallel processing and multitasking as they "read to do." They have less time to read deeply into texts and may be trying to complete several tasks or objectives at once. In fact, how they gather information takes on a new form. Instead of a straightforward information gathering process, as digital immigrants may be familiar with, digital natives use a multi-step process. First, they graze all available information, and then do a deep dive, followed by a feedback loop (Palfrey and Gasser, 2008, p. 241). This process also demonstrates the importance of satisficing, as first people gather information shallowly, and then take a deeper dive into what they need. The last step in the process is one that digital immigrants have not been familiar with. The feedback loop looks at how users socially interact with information. This interaction may involve a blog post, a post on social media or sharing in some other way (Palfrey and Gasser, 2008, p. 242). All of these are important steps, and technical documentation must facilitate these activities for digital natives.

How has Technical Communication Evolved with the Web?

While instructional manuals are still very important, the types of places that people go to seek support and guidance has evolved in the digital age. Many people are performing Google searches, seeking instructional videos and scanning website forums to find answers to their questions. In this way, people are able to conduct searches for their information, and can scan the

results for the information they seek. These tools provide the ability for users to scan to find the information that they need quickly, rather than taking the time to search through a printed manual for the answer.

Forums

Forums provide an interesting companion to the instructional manual, because they allow users to both seek and provide information within a larger community. In this setting, users become the creators of content. This can create a lively, interactive community and allows for a new level of interaction with a product or company.

The only drawback to this form of communication is that technical communicators are not the ones producing the content. Instead, the "conversation" is started by users who have questions and enthusiasts and/or self-proclaimed experts provide the information and answers. While crowd sourced sites and forums often provide accurate and concise answers, they may not always be officially sanctioned by the company or reference correct information according to the instructional manual created by the technical writers. Some companies, such as Apple (discussions.apple.com) provide forums as part of their suite of technical communication, which provides users with access to official instructional manuals, live help and a forum. The forum allows users to have conversations about their issues and helps to solve them. Companies who have set up forums on their website include Amazon for Kindle, Facebook.com, Comcast, and Microsoft.

The mainstreaming of forums for information shows that users have new expectations for the support they seek. Users want to be consumers and creators. Users have new needs in regards to social interaction, and this can be integrated into technical documentation. In "The Rise of the Expert Amateur: DIY Culture and Citizen Science, Eric Paulos investigates the new expectations that users have for creating and influencing content on the web. Community interaction is now an important part of technical documentation because "We now expect our computing tools to be driven by an architecture of open participation and democracy that encourages users to add value to their tools and applications as they use them" (Paulos, 2009, p. 1). While many still and will continue to use traditional instructional manuals, new expectations of technical documentation and interaction drive them to seek other alternatives. Engaging a community of enthusiasts

online is a new method of technical communication that provides scanability and interaction outside of the written manual.

YouTube and Video Tutorials

In addition to interactive user forums, instructional technical communication has come to encompass visual technologies. These technologies are often in the form of YouTube and other online video tutorials, which provide users with a way to gain technical information and skills outside of the written text. Videos provide a way for users to use their audio and visual senses to absorb information. They learn visually by seeing others complete the task first and then replicate the actions themselves. This is another form of satisficing; users can see how to accomplish their task and allows them to see instantly if they are following the correct steps to achieve their goal.

Popular hosting sites such as Lynda.com or Good-Tutorials.com provide users with many instructional videos where they can learn in an interactive, step-by-step format. Technical communicators can create excellent video tutorials, just as they can create texts. In their article "YouTutorial: A Framework for Assessing Instructional Online Video," Morain and Swarts (2011) provide a rubric by which to assess instructional videos and through their assessments found "...that many of the qualities that make instructional videos good are the same qualities that make good written procedures: clear goals, a structure that supports reading to do, concrete details, and user feedback." (Morain and Swarts, 2011, p. 17). Technical communicators can apply many of the same types of expertise to creating concise and well-constructed instructional videos. These types of artifacts will be very important to the field of technical writing and can be easily incorporated in other text-based manuals for a multimodal approach to technical communication. To investigate how digital natives interact with these forms of technical communication, I conducted a survey to learn more about their expectations and needs.

How Do Digital Natives Interact with Technical Documentation?

Methodology

To better understand how digital natives interact with and use technical documentation, I conducted a survey (Appendix A) comprised of multiple choice questions and scenarios that required a free-form paragraph answer. These questions were designed to gain a deeper understanding of the motivations, interactions and situations in which digital natives use technical communication to solve their problems. The survey was hosted on a Google form and was distributed to 21 digital natives. This platform was chosen because it afforded flexibility for people to respond on any device (computers, phones, tablets) and at a time that was convenient for them.

Participants were selected to fit within Prensky's definition of a digital native, which includes anyone born after 1980. Ten of the respondents were in an advanced writing class at the University of Minnesota in the Fall of 2104, while 11 were acquaintances within this age group.

The Survey

The survey (Appendix A) consists of 12 questions: 10 multiple choice and 2 free form answers. The questions were designed to gain a deeper understanding of the previous areas:

- Manuals
    - Preference for print vs. online access
    - How often manuals are accessed
    - Motivations for accessing manuals
- Video Tutorials
    - Number of users who have used video tutorials to solve problems
    - Motivations for accessing video tutorials
    - Trust in hosting site (company sponsored vs. third party)
- Forums
    - Number of users who have used forums to solve problems
    - Experiences with forums
    - Trust in hosting site (company sponsored vs. third party)
    - Participation in forums (posting a question and responding to a request)

- How people naturally react in situation that would require technical documentation (open response)
    - Solving software problems
    - Assembling a product

Survey Results

The results of the survey for each question are provided below. Each section includes a graph of the quantitative data, with a brief explanation of the results. A summary of the qualitative data is provided for the two free form response questions.

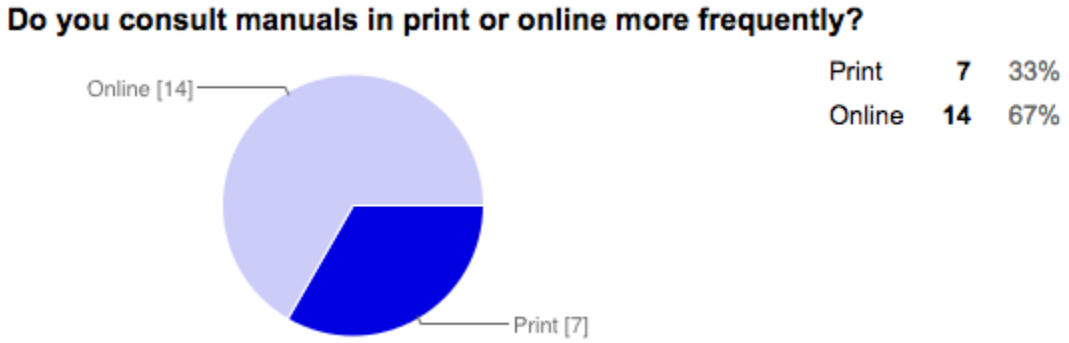

Figure 2: Preference for print vs. online access

The survey found that 67% of digital natives surveyed prefer online manuals, while 33% preferred printed manuals (Figure 2). It is interesting that while not everyone prefers online manuals to print, there is an undeniable trend toward people favoring online versions of manuals.

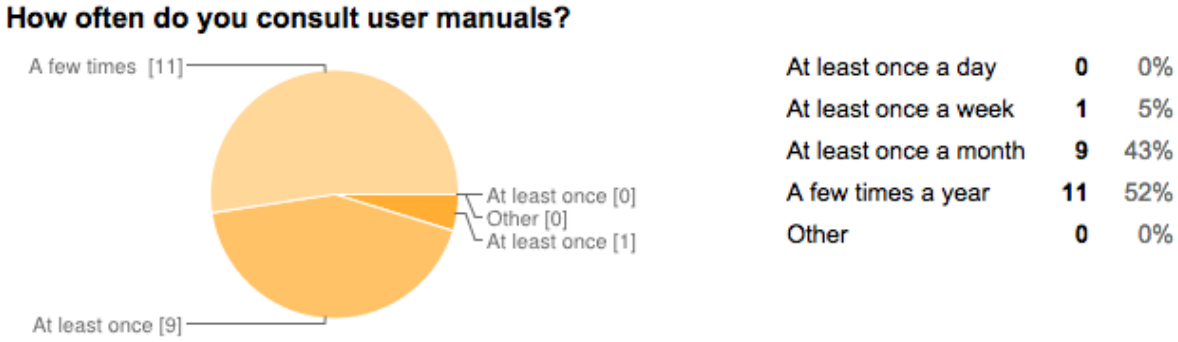

Figure 3: How often use manuals are accessed

The survey found that people accessed user manuals anywhere from once a week to a few times per year (Figure 3). This question was included in the survey to gain a better understanding of the frequency that people use traditional manuals and technical documentation.

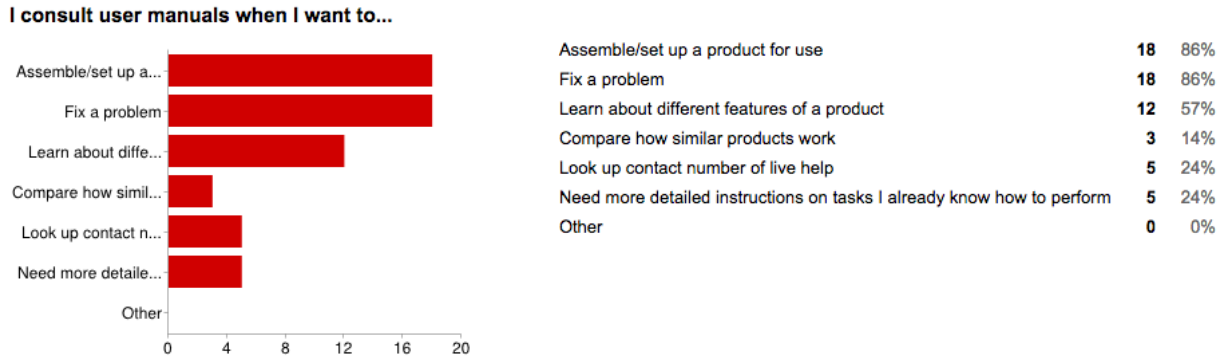

Figure 4: Motivations for accessing manuals

The top three reasons why people access user manuals are to assemble or set up a product for use, to fix a problem, or to learn about different features of a product (Figure 4). This question helps to understand the underlying motivations for users and why they access user manuals. Most people in these circumstances "read to do" and are most interested in performing actions with a set end goal, such as assembling a product or fixing a problem.

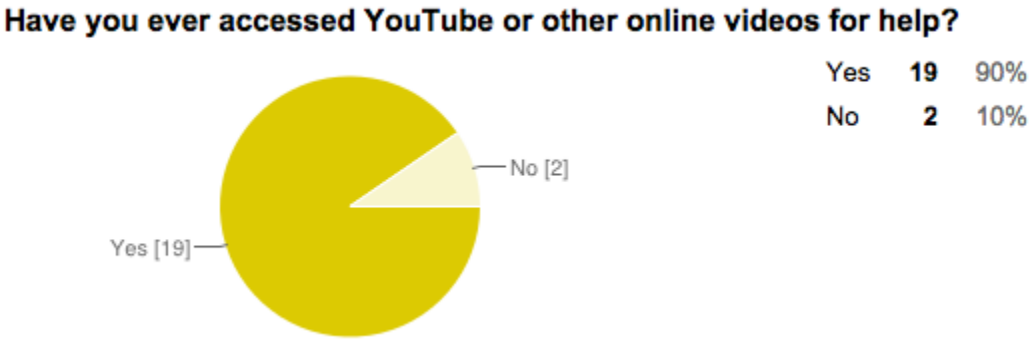

Figure 5: Number of users who have used video tutorials to solve problems

This statistic was particularly interesting, 90% of those surveyed have used YouTube or a similar online video to solve a problem. This statistic demonstrates the importance of online video tutorials and their importance for resolving issues.

Figure 6: Motivations for accessing video tutorials

This graph (Figure 6) discusses the varied motivations behind accessing a video tutorial. In most cases, people wanted to watch someone to complete the same task. Other common responses include "I wanted to follow along and perform the task at the same time" and "I wanted to be able to pause the video as needed," and "I am a visual learner." These answers focus on the need for a visual companion to the text so that people can see the actions performed in real-time.

Figure 7: Number of users who have used forums to solve problems

This was a particularly interesting finding from the survey. Forums, which provide content typically generated by users and not technical communicators, were a common resource that 90% of respondents used to answer a question that they had.

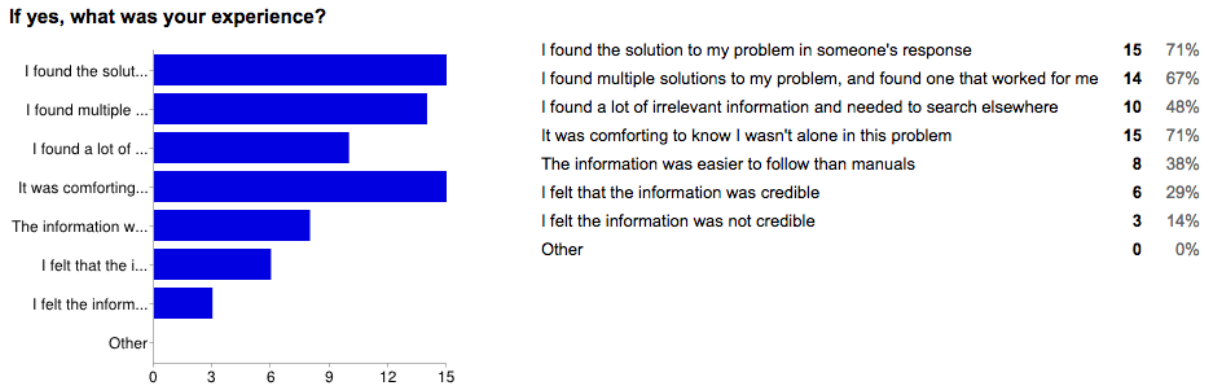

Figure 8: Experiences with forums

When asked why people typically use forums to find their answer, the results were surprising. The top two choices used to describe their experience in using forums were, "I found the solution to my problem in someone's response" and "It was comforting to know that I wasn't alone in this problem." While people looked to forums for resolution to their problem, they were also comforted by the fact that they weren't the only ones experiencing difficulty. This response speaks to the desire for social interaction when solving problems.

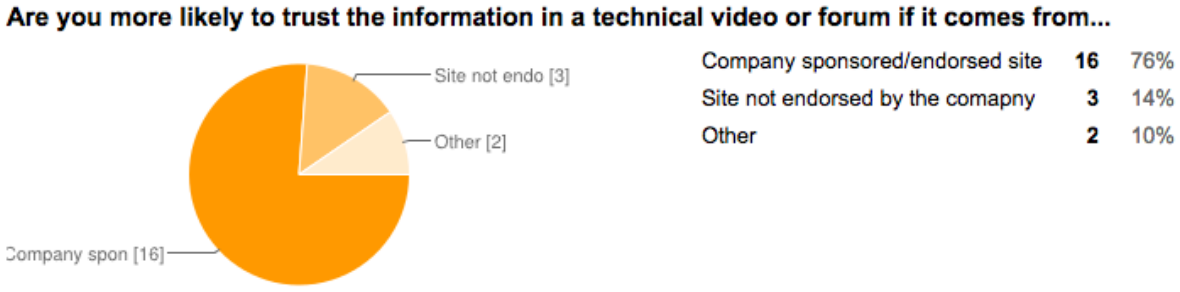

Figure 9: Trust in hosting site

This question investigates the need for companies to sponsor or endorse these untraditional forms of technical communication. 76% of respondents said that they would be more likely to trust the video or forum if it was hosted on a company sponsored or endorsed site. This shows the importance of providing users with content that is verifiable and trustworthy.

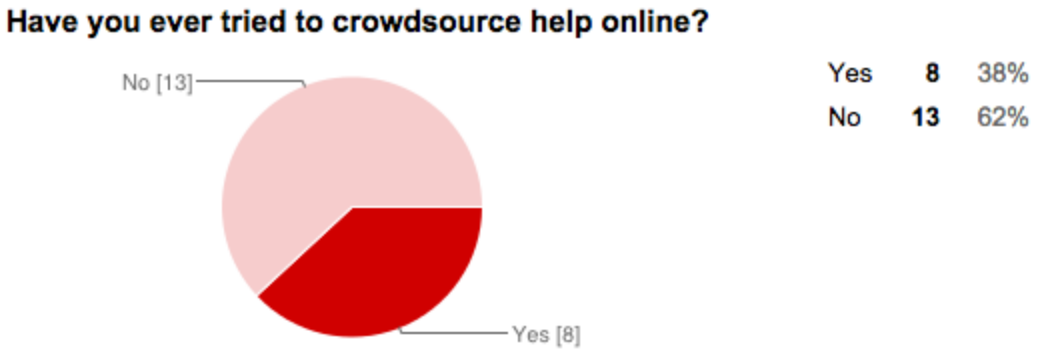

Figure 10: Participation in forums (posting a question)

While many people use forums, a lesser amount of people try to crowdsource for this help online. The majority of respondents, 62% said that they have not tried to crowdsource help online, while 38% have.

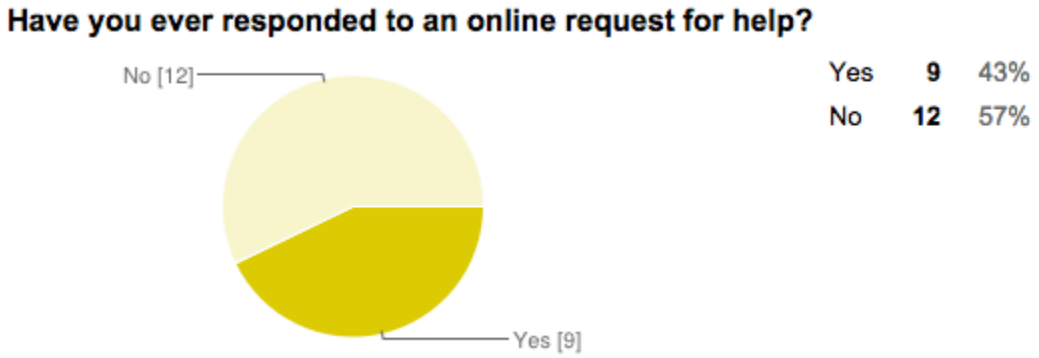

Figure 11: Participation in forums (posting a response)

While only 38% had requested help, 43% of respondents have replied to an online request for help. People were more likely to help out than request help themselves. However, the majority of people, 57%, have not replied to an online request for help.

The survey concluded with two scenarios:

1) You need to transfer music from iTunes to your iPhone. You plug your iPhone into your computer and select the music you want to add. You click “sync” but the music does not show up on your phone, even though iTunes confirms that the transfer is complete. After attempting one more time, you need to seek help. Where would you look for help and why would you choose this method?

For this question, respondents were asked to describe how they would solve this problem with software on their device. This question was designed to prompt discussion on how the respondent would resolve their issue without any constraints. People noted that they would try to crowdsource the information on Facebook (facebook.com), would try to access the company website, and check forums. However, the most common response was that they would try to use Google (google.com) to find the answer to their question. People are more likely to type their problem into Google and use that as a jumping off point for the types of technical communication that they access.

2) You are setting up a new TV. The TV comes with a setup manual and a link to a digital version of the guide. Do you use the setup manual as is, or do you access the digital version? Why did you choose this method?

This question prompted respondents to describe the actions that they would go through when assembling a product that came with a printed copy of the setup manual. The majority of respondents said that they would begin by using the setup manual included with the product, simply for the sake of convenience. If they did not find their answers in this document, or if they wanted more information they said that they would then access the online version. Some said that they would start with the online version outright due to the affordances of easily searching through the document, the potential for online videos and user comments. Some said that it was helpful to have access to the online version of the manual because they knew that they could not lose it.

Analysis and Conclusions

Analysis

The results of this survey showed that many people are interested in the affordances associated with online technical communications, particularly the use of forums and videos for use in problem solving.

Videos are a key component of technical communication and many people use them because they are a visual medium and users can easily get the information that they need. One of the major affordances of video is that users can watch someone complete a task in full. Users can also pause the video as needed and can follow along at the same time. These findings are in

accordance with the typical traits of digital natives as outlined above. Digital natives prefer to learn in "real time" and are also visual learners, preferring to see something before reading about it. Video tutorials and instructions allow uses to follow along with them, completing the task as they watch the video. They are also able to pause as need be.

It was also interesting to note that 90% of respondents have used a forum as a way to find information and solve their problems. This shows how important forums are as a method of technical communication. Most interesting though, respondents cited that forums showed them that they were not alone in the problem and that they found it comforting to know that other users were experiencing similar issues. Forums allow for social integration and can help foster a community of users. Crowdsourcing information within a forum is becoming an increasingly important aspect of technical communication. Forums also allow for companies to continue the user experience within the feedback loop, the final step in information gathering for digital natives. Companies can continue to foster customer service through this method of communication.

In the free form responses, particularly the one about solving a software issue, Google was mentioned in the majority of the responses. Google searches allow users to find the most concise and relevant information in the shortest amount of time. This search can garner many results and users can satisfice by reading shallowly, then diving deeper into the site that will provide them with the best and fastest answer for their situation. This is a form of satisficing. In this Google search, it is possible that many different forms of communication will be found including video, forms, manuals, company sponsored materials and unaffiliated materials. In some cases, users satisfice based on the mode of communication before they even reach the content. They may determine that video has certain affordances, while forums and manuals present other benefits depending on the context.

This method of satisificing is evident in the second free-form response question that asks how the respondent how they would set up a TV if they had the option of the print manual in front of them, or if they would access the information online. Many said that they would consult the print manual in front of them to find the answer and if they couldn't find what they were looking for,

they would access the online manual for additional information. The fact that they did consult the print manual, and that about a third of respondents said that they consult print manuals more frequently, show that print manuals are still important to include.

With all of these forms of technical communication available, manuals are still relevant. Many people still access them when looking for answers, however people don't expect to find all of the answers they need in one place, as evidence by the responses in the free form results. Some people thought that print resources would be adequate, while others anticipated that they would not be able to find all of their answers in this. People engage with different types of technical communication to solve their problems, and the traditional instructional manual still provides many of these answers.

Conclusions on Technical Communication for Digital Natives

From the results of the survey and additional research, it is clear that the needs of digital natives, in regards to technical communication are changing rapidly. The comprehensive technical communication solution for digital natives needs to include, at minimum, a printed manual, an easily accessible online version, video tutorials and a company sponsored forum.

It is important to include both the printed and online manuals because both offer different forms of satisficing. In some circumstances, the print manual offers easy access and is able to be passed or referenced easily if kept some place memorable. However, the online manual has many affordances especially because it can never be lost. Also, it is useful in a reference because users can easily perform a search (ctrl f) to find the exact keywords or phrases they are looking for without having to take the time to read the whole document.

Forums are becoming an increasingly important component of technical communication. Digital natives thrive in networked, social environments and forums allow them to connect with a community of users and enthusiasts. Social aspects of troubleshooting are very important because they help to facilitate the customer experience in real time.

Many people said that they found it comforting to know that others were experiencing their same issues, and this allows companies to facilitate and explore new aspects of the customer and user experience. Forums provide companies with the opportunity to interact with their customers, allowing them to have additional control in maintaining brand excellence.

A large majority of respondents (90%) said that they have accessed an online video or tutorial to help solve a problem. Digital natives are visual learners and like to watch people complete tasks instead of relying on text heavy communications. They are also adept at multi-tasking, and they find that they want to watch someone complete the task while they complete it as well. Many said that they found the pause button very helpful, because it allowed them to stop at any given time. Video tutorials are a key aspect of the technical communication suite because they allow users to solve their problems through a completely visual mode.

What is the Future of Technical Documentation?

Right now society is comprised of both digital immigrants and digital natives. Technical documentation is making its way online with many companies putting their product manuals on their websites, hosting forums to facilitate conversation and creating videos to provide another method by which people can access the material. The role of the technical writer is rapidly expanding, and the definition of the types of "writing" they do is expanding rapidly. In "Professional and Technical Communication in a Web 2.0 World," Stuart Blythe et. al. conducts a study of the different types of writing that alumni of professional and technical communication programs (PTC) create in their position, categorizing them between the types most often created and the most valued. The types of writing range from email to instruction manuals to scripts to infographics (Stuart et. al., 2014, p. 273). Technical writers create many different types of communications, and are longer limited to a traditional text and image-based communications. The study also discusses the importance for technical communicators to be well versed in multiple technologies (Stuart et. al, 2014, p. 275). In addition to this, the study notes that technical writers need to develop skills in regards to visual communication; "One concept the data reveals is that PTC alumni are taking responsibility for an increasing amount of visual communication...This suggests that PTC alumni are largely required to complete visual work without the help of a design specialist and thus they need specific training with the concepts and

technologies in this area (Stuart et. al., 2014, p. 279). This is likely to be a continuing trend, especially as digital natives require more visually based content. It is important for technical communicators to understand how to facilitate visual communications.

In the future, new technologies may emerge that will address the need for visual communications and additional social aspects. One area not explored in this paper is the use of Facebook and Twitter, and other social media platforms as hosting sites for technical documentation. Many people already use these for sites for interacting and gathering technical information, and this will likely expand in the future. Technical communicators will need to be savvy in using these platforms in order to deliver information that will be useful to customers. In this way, the role of technical communicators will begin to encompass aspects of customer service. While these tasks could be left up to the marketing department, technical communicators act as a liaison between the experts and novice users, much like they did at the beginning of the field. This will continue, but the connection to the users will be more direct and occur in "real time."

Technical writers will also have a greater role in producing and maintaining video communications. Technical writers won't only write, but they will also need to develop skills in other areas such as video production and editing. They will need to create scripts, work with video equipment and may need to either act or recruit actors to participate in the videos. Creating coherent audio-visual communications will be very important, especially as people rely on these as their main source of information.

As new devices and platforms are invented, technical communicators should look for ways to utilize their affordances and integrate these technologies into their collection of content. New platforms and devices, especially wearable technologies, will have new affordances and it will be important for technical communicators to cater content to work with emerging technologies. Head mounted displays, and in particular Google Glass, have many opportunities for technical communication. One of the main affordances of this technology is that it allows users access to information while leaving their hands free to do other tasks. Google Glass has the ability to display video, tweet and display information. Technical communicators and companies can take advantage of these affordances by catering content to this platform. While Google Glass has

immense potential for the consumer market, Google Glass also has the ability to revolutionize instructional and training communications for manufacturing industries. In this context, "Google Glass provides a hands free way for workers to complete tasks without having to look away or fumble with instructional or training manuals. With Google Glass, all of the necessary information is located in the corner of the users' eye, which would allow for greater focus when working in hazardous situations" (Ellingson, 2014, p. 1). Technical writers can explore how to create content that capitalizes on the affordances of these technologies.

Companies will need to begin to update their current technical documentation practices so that they continue to capture and reach audiences. Technical documentation, especially as it moves into non-text areas, will be a part of the whole customer experience and can create a loyal following of digital natives, or a lack of accessible information has the potential to alienate them completely and inspire them to choose other product options. As new platforms and technologies are developed and optimized for customer use, they will become integrated into everyday life. It is important that technical communicators stay up to date on new technological developments, their affordances, and how these can be utilized to facilitate communication and develop a meaningful experience for customers. In everything they create, technical writers should focus on making information scannable so that digital natives can access information quickly and easily, dive deeper when needed, access videos to capitalize on their desire to process information visually, and facilitate forums to keep the conversation going.

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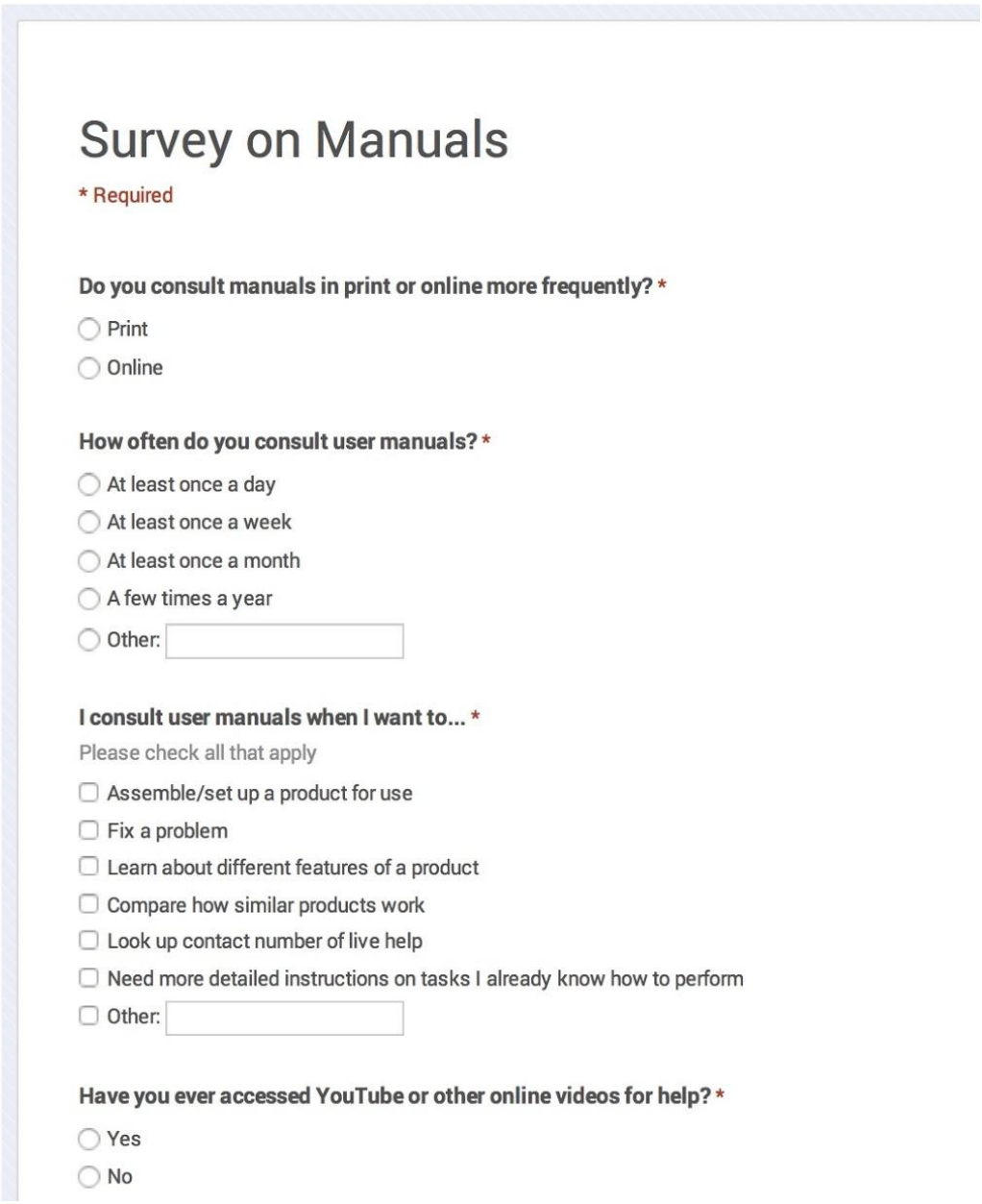
Appendix A



Survey on Manuals

* Required

Do you consult manuals in print or online more frequently? *

- ◯ Print
- ◯ Online

How often do you consult user manuals? *

- ◯ At least once a day
- ◯ At least once a week
- ◯ At least once a month
- ◯ A few times a year
- ◯ Other:

I consult user manuals when I want to... *

Please check all that apply

- ☐ Assemble/set up a product for use
- ☐ Fix a problem
- ☐ Learn about different features of a product
- ☐ Compare how similar products work
- ☐ Look up contact number of live help
- ☐ Need more detailed instructions on tasks I already know how to perform
- ☐ Other:

Have you ever accessed YouTube or other online videos for help? *

- ◯ Yes
- ◯ No

- [ ] I wanted to able to pause the video as needed
- [ ] I did not have access to written instructions
- [ ] Video was the first place I thought of to seek help for this task
- [ ] I am a visual learner
- [ ] I needed to access instructions on my smartphone
- [ ] I wanted to read the comments section
- [ ] Other:

Have you used a forum to find the answer to your question? *

- ◯ Yes
- ◯ No

If yes, what was your experience?

Please select all that apply

- [ ] I found the solution to my problem in someone's response
- [ ] I found multiple solutions to my problem, and found one that worked for me
- [ ] I found a lot of irrelevant information and needed to search elsewhere
- [ ] It was comforting to know I wasn't alone in this problem
- [ ] The information was easier to follow than manuals
- [ ] I felt that the information was credible
- [ ] I felt the information was not credible
- [ ] Other:

Are you more likely to trust the information in a technical video or forum if it comes from... *

- ◯ Company sponsored/endorsed site
- ◯ Site not endorsed by the comapny
- ◯ Other:

Have you ever tried to crowdsource help online? *

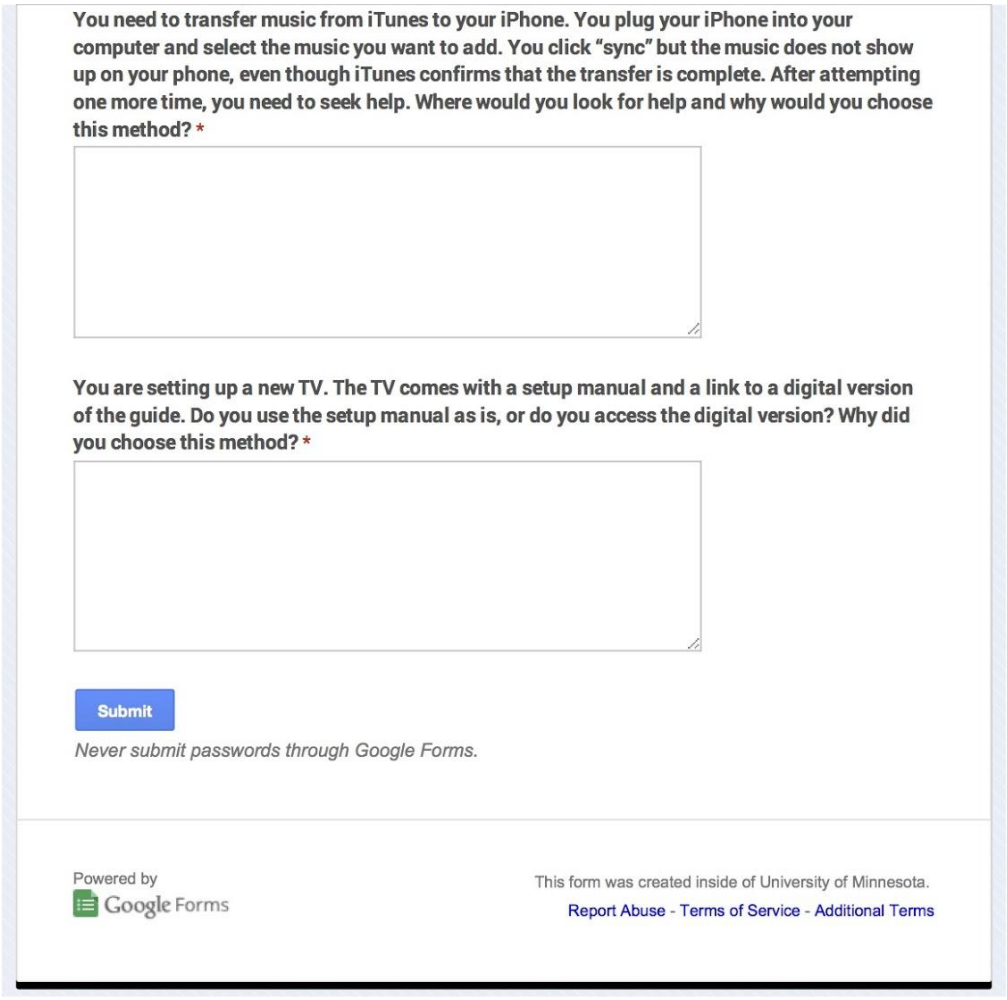
Examples: Facebook, Twitter, Company's forum

- ◯ Yes
- ◯ No

Have you ever responded to an online request for help? *

Examples: A response on Facebook, Twitter, or Company's forum

- ◯ Yes
- ◯ No



You need to transfer music from iTunes to your iPhone. You plug your iPhone into your computer and select the music you want to add. You click "sync" but the music does not show up on your phone, even though iTunes confirms that the transfer is complete. After attempting one more time, you need to seek help. Where would you look for help and why would you choose this method? *

You are setting up a new TV. The TV comes with a setup manual and a link to a digital version of the guide. Do you use the setup manual as is, or do you access the digital version? Why did you choose this method? *

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