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Literature Review

Two-fold Demands in the Use of Online Tools in Collaborative Work

Abstract: Online collaborative writing tools (OCWTs) are important aspects of the technical and professional communication workplace and education experience. These prominently-used software tools have varying functionalities and characteristics. This literature review examined studies of expectations and experiences with these tools from both the student and practitioner perspective. Students and practitioners generally report positive experiences with these tools. However, the tools often tempt students to not work collaboratively, which can lead to adverse performance in the classroom setting. It was found that both accessibility and collaborative ability are important when choosing a tool for collaborative work. Generally, the tools are meeting demands, and concerns regarding security and chat abilities have been abated by recent updates. Future research should be conducted on the use of OCWTs in the practitioner setting and should veer away from survey methods towards case studies and participant observation studies.

As the "digital natives" generation continues to mature and enter the workforce, the variety of online tools that aid in collaborative and virtual work grows as well. Online collaborative writing tools (OCWTs), defined by Behles (2013, p. 30) as "tools that allow users to work collaboratively on writing projects through digital media," are of specific interest in the technical and professional communication (TPC) world.

Tools such as Google Docs, Sharepoint, and online wikis enable users to collaborate with others on document work through an online portal. In this literature review, I'll first establish the now seemingly-critical nature of the OCWT and provide an overview of usage statistics for these and similar tools. Second, I'll argue that user experience and satisfaction with these tools relies on two main characteristics. Finally, I'll evaluate just how well these tools are meeting those demands at present.

OCWTs are now nearly ubiquitous. They have a solid presence both in the classroom and the practitioner's desktop. As of 2017, Google Drive claims 800 million users. This service provides document storage as wells as an OCWT software-as-a-service (SaaS) tool named Google Docs. Google Docs and other OCWT applications are important because they enable collaboration and efficiency by allowing multiple team members to work in a single space remotely (Perron 2011). But exactly how common is the usage of these tools in industry and in the classroom?

Quantitative Overview

Practitioner usage of OCWTs

Practitioner usage of OCWTs is common and frequent. Nearly 60% of practitioners in technical communication report using OCWTs on a daily basis; 85% of practitioners report having used OCWTs in general. Tools such as Google Docs and Microsoft SharePoint are becoming industry standard (Behles 2013). Additionally, in a separate survey, over 80% of designers had used some sort of online collaborative tool in the past six months; of those designers, 60% had actually used social media in order to communicate about collaborative team work (Alcantara 2015). It is obvious that practitioners should be familiar with these tools to stay competitive in the workplace; the flexibility enabled by the use of OCWTs in technical communications work is not to be taken lightly.

The advent of Web 2.0 and social media has knowledge workers thinking dynamically about content and curating online media. Publicly available online services (PAOSs [e.g. Twitter, LinkedIn, Google Docs]) enable collaborative manipulation of information. A recurring four-year

survey of knowledge workers suggests widespread adoption of PAOSs to accomplish work tasks (Ferro 2014). The aforementioned survey reports that PAOSs are used between 20-27% of the workweek in knowledge work, and each year of the survey the most prominent site reported was different. Practitioners report using PAOSs to consume, contribute, edit, and share information, and to plan and coordinate. The multi-functionality of a multitude of tools results in widespread usage of unique tools (Ferro 2014). Over half of those surveyed reported using a PAOS to edit information in their work tasks, with 37 unique sites reported in the open-ended part of the survey question. Of these, Google Docs was the most frequently mentioned (Ferro 2014).

With percentages of usage of tools such as PAOSs and OCWTs hovering in the 90% range of adoption, it is obvious that these tools have become ubiquitous in the TPC workplace.

Student usage of OCWTs

There is much more available literature regarding student usage of OCWTs. Similar to practitioners, about 85% of students report using OCWTs (Behles 2013). Interestingly, students were not very familiar with the typical tasks performed by practitioners, such as scheduling and document sharing, that are enabled by these tools (Behles 2013). Students reported features-driven (bells and whistles) decision making when faced with choosing a certain OCWTs to perform a task (Behles 2013); however, a survey of undergraduate students found that nonfunctional quality (quality of the application related to execution rather than features) has a stronger impact on user satisfaction for OCWTs (Kim 2014). Indeed, when students were introduced to Google Docs for the first time in an assigned classroom project, they reported interest in using the application again due to its usefulness in collaborating outside of class

(Zhou 2012). In a similar study, 100% of students reported that using Google Docs to work outside of class on a project was "easy" or "very easy" (Suwantarathip 2014).

Before user satisfaction, though, comes user choice. This literature review found two important categories of features that emerge repeatedly in studies of the usage of OCWTs: accessibility and collaborativity.

Prominent Characteristics of OCWTs

Any sort of design involves a balancing act; software design is no different. Engineers must balance usefulness with stability, features with security, and cost-effectiveness with marketability. It is no surprise that when evaluating OCWTs, two-fold desires emerge.

Accessibility

The ease and convenience of use is important in evaluating OCWTs (Briones 2017, Kim 2014). A low learning curve is beneficial when beginning to use these applications, as it is important that the software becomes an asset rather than an impediment in implementing work (Kalin 2012, Harris 2016). Additionally, practitioners reported that ease-of-use is an important consideration when choosing tools to work with, as these tools may be sent to clients and other stakeholders with much less familiarity with technology (Alcantara 2015).

Accessibility across devices is also an important consideration for users (Harris 2016, Alcantara 2015). When students in a small graduate-level education class used Google sites for their classwork, 43.2% reported that they accessed the classwork over multiple devices; 43% in this study also reported that they accessed the Google site more often than they would have accessed a class site through a traditional learning management system (LMS) (Harris 2016).

This product evaluation also found that the site was easy to navigate and interactions in the class were improved versus a traditional LMS (Harris 2016). OCWTs are not only a tool to be used to maintain content, but to enable students to be active participants in learning and developing content as well.

Similarly, Kalin (2012) set out to investigate the process of collaboration using collaborative technologies. Groups of students were assigned to write a memo on collaborative technologies and then follow up with how they ended up using the reported tools in a project later in the semester. While accessibility, a/synchronicity, and collaborativity were identified as three coding categories that were important to students in the collaborative technology memo, students were hesitant to adopt unfamiliar technology due to a potential learning curve, indicating that familiarity with a tool is considered when evaluating tools for adoption. This type of accessibility proved important in other studies as well; Riley-Huff (2010) and Mehlenbacher (2015) both reported that previous familiarity with a product was a positive when working with the collaborative tools. Tan (2015) found significant association between prior experience with a SaaS tool (specifically, Google Docs) and self-reported IT skills and user acceptance of the tool. Increasing accessibility and familiarity with a tool increases its adoptability.

Social media is also described as an accessible collaborative tool; 60% of designers surveyed reported having used social media to perform collaborative work (Alcantara 2015). While it is intriguing that so many respondents use social media to keep track of work-related information, social media is incredibly accessible. As one interviewee in Alcanatara's study stated, "Everybody uses Facebook." Students also mentioned using Facebook in a group

project; the combination of its accessibility and communicative features make it hard to ignore (Kalin 2012).

However, not all users of these collaborative services find them accessible. Employers' capabilities to "block" certain websites and mandate the use of others means that oftentimes, practitioners do not get to choose for themselves which sites to use. About one-third of a surveyed group of knowledge workers reported workplace restrictions of the use of publicly available online services, with a majority of those respondents stating that their company blocks websites from use completely (Ferro 2014). This complicates the ability to extrapolate studies of the use of OCWTs in the classroom to the workplace and vice versa. However, Ferro (2014) did not provide a breakdown of *which* sites specifically were reported as blocked. While Google Docs and Facebook both fall under the large umbrella of PAOSs defined by Farro (2014), obviously one of these things is not like the other.

Accessibility and security were both found to have higher impacts on user satisfaction than functional qualities (the services the system provides to the user). Kim et al. performed a survey with 150 respondents that found that while both functional and non-functional quality positively affect user satisfaction, non-functional qualities (accessibility and security specifically) affect user satisfaction to a larger degree.

Riley-Huff (2010) reported some security concerns among a group looking to organize a conference presentation when evaluating tools for use in arranging their presentation. However, her group was able to mollify the concerns by pointing out that the Google Docs program only allows users access to documents if they are specifically invited to them or the link is shared with them. Similar concerns were reported by participants in a study by Kai-Wai

Chu (2011); on a scale of one to five, student respondents averaged "privacy issues" above the midpoint, five being "very much so" a concern. As such, when evaluating OCWTs, it is important to take the security features of the program into account.

Ultimately, accessibility seems to be the determining factor when initially evaluating an online collaborative tool for use; initial barriers such as ease of access to the site (users may already have Google log-ins, users may already be on Facebook, etc.), cost to access the site, and general jargon need to be low. Practitioners should use universal tools in order to be more accessible to clients and stakeholders. Students need to keep their time spent to a minimum and focus on content as well.

Collaborativity

Kalin (2012) defines collaborativity as "the process or mode of collaboration and the role of technology in facilitating that collaboration." For a site to show collaborativity, it must further collaboration and efficiency. Collaborativity and its comprising features make OCWTs more beneficial to their users.

The ability to form groups, communicate within groups, and collaborate exclusively within groups on shared documents is a positive feature for many users (Alcantara 2015, Harris 2016, Kim 2014). As mentioned previously, social media accomplishes this goal quite well (Alcantara 2015, Kalin 2012). Facebook has a group feature and an instant messaging feature; being able to communicate exclusively within a group quickly is crucial to timely accomplishment of goals. However, as neither of the studies by Alcantara and Kalin focus on an American TPC practitioner, it is unclear how applicable this suggestion is in a typical American workplace. Indeed, Behles (2013) makes sure to mention that while the most commonly used

OCWT among TPC practitioners is Sharepoint, most of those reporting using Sharepoint stated that it is the program of choice by their company's IT department, not their own choice. Students most commonly reported using Google docs, which makes for an important consideration: frequency of choice does not necessitate enthusiasm (Behles 2013). Kalin 2012 does note that while students were hesitant to adopt new tools in group work, they understood that communication is an important aspect of the collaborative process. Email, cell phones, and instant messaging were used by multiple groups in their study, which indicates the widespread need for communication as a function of SaaS tools; as such, the functionalities of group formation and communication within a tool should not be ignored when evaluating a tool for collaborative work.

In addition to group formation, another important factor in evaluating the collaborativity of OCWTs is the ability to facilitate communication. In a graduate level course, students reported increased communication when using Google sites as a main course site instead of their traditional LMS (Harris 2016). The commenting feature in the tool allows users to leave comments for asynchronous work, and the chat feature allows live chatting when multiple users are viewing or editing the document. Google Docs can decrease the amount of face-to-face time and external communication needed when collaborating on a document (Riley-Huff 2010, Zhou 2012), which is an important consideration for users.

OCWTs must be used correctly in order to improve the final quality of a piece of work. Editing and suggesting are two forms of collaboration that are the most impactful in positively affecting perceived quality of a final document (Caspi 2011). While group work may decrease perceived ownership in a student project, the quality trade-off is important to consider.

Collaboration, rather than knowledge sharing, provides a stronger advantage in improving the quality of work (Caspi 2011). In order to be maximally beneficial, OCWTs must have features that enable editing and suggesting.

While the study by Harris that evaluated switching an LMS to a Google Apps-based classroom did not evaluate the tools' impact on learning or grades, a similar study did evaluate the impact on grades of the implementation of collaborative learning using Google Docs (Suwantarathip 2014). Taking into account students' attitudes towards collaborative writing and the degree of collaboration of groups that students worked in, the authors found that students that participated in a group that collaborated using Google Docs gained higher mean scores than those working in groups in a face-to-face classroom. The authors believe the improvements were due to three reasons: the collaboration method, the features in Google Docs that motivated learning, and more contributions to work by the individuals. The author argues that features that motivate learning include: commenting features that lead to meaningful revisions, student support without the restrictions of time and place, and the program's setting to record the history and contributions of each member so that each individual can be held accountable. While the low sample size of this study (two sections of a 40-student English class) means that the results shouldn't be generalized, it shows that the collaborative features of being able to provide feedback and make edits on others' work contribute positively to a final product and learning experience that is increased in quality.

A danger of the OCWT is the tendency of students to cooperate rather than collaborate on a product (Kalin 2012). Students are hesitant to edit work other than their own (Caspi 2011). Students used Google docs and other applications in order to split up necessary sections before

a group member collated them together (Kalin 2012); while this might be a desired feature in the TPC workplace, more sophisticated manipulation and assignments are needed for knowledge generation to be the end result of the use of OCWTs by students. Studies on possible ways to manipulate the collaboration practices of students are discussed in the following section.

The cooperation/collaboration fallacy in the academic setting

Collaboration as a process is intricate and deliberative. Participants have an obligation and an imperative to carefully consider roles and responsibilities when collaborating on work. Effective collaboration starts from shared knowledge and interests; participants benefit from prior face-to-face working relationships and balanced inputs in terms of vision and effort. (Vallance 2012).

Simultaneous collaborative writing (SCW) has been found to facilitate the co-construction of knowledge, which is a concept based in sociocultural theory that emphasizes social discourse in learning (Levenberg 2015). The goal of instruction is to further learning; in an academic setting, purposefully assigning students to work in a OCWT environment (rather than open-ended) is only beneficial if it improves learning outcomes. However, very low instances of SCW were found in an evaluation of multiple versions of a co-worked document (Levenberg 2015). This suggests that while the asynchronous feature of many OCWTs is used very frequently, it is not beneficial to the construction of knowledge. The findings suggest that interwoven SCW (people working on the same topic in the same immediate space) will facilitate a higher phase of co-construction of knowledge (application of constructed knowledge or modification of proposed synthesis) (Levenberg 2015). Students have an inclination to stick to

familiar habits, including the perception of writing as a singular, isolated process. Knowing this, mandatory processes should be modified in order to increase the levels of SCW that occur in an assignment, so that collaborativity and construction of knowledge is maximized.

A separate study, however, was unable to confirm increased learning using Google Docs in a collaborative writing project (Zhou 2012). Students in a psychology class were given a short open-ended assignment after a class lecture to complete in groups outside of class time with no guidance on how to complete the assignment, then given a second assignment with instructions and guidance on how to use Google Docs to complete the assignment. While over 80% of the students reported a positive experience, and nearly the same amount said that the program had a positive influence on their group's collaborative experience, no significant difference was found in students' grades between the two assignments. (Zhou 2012) I personally posit a few possible causes of this phenomenon; first, the students were not using Google Docs to perform any sort of knowledge construction, only to facilitate their own work. It is possible that the cooperation fallacy struck again, as there was no enforcement of *how* Google Docs was meant to be used in this experiment. Second, unlike the previously mentioned similar studies (Suwantarathip 2014 and Levenberg 2015), students were not revising a single piece of work using the program; instead, they completed two entirely separate assignments while remaining in the same groups. It's possible the scores stayed the same because the same group members took the helm of the project and the groups did not take full advantage of the features of Google Docs.

Are Expectations Being Met?

It is easy to establish the two-fold demands of OCWTs: accessibility and collaborativity. However, are these tools meeting their demands? This section offers some perspectives from the research world.

Riley-Huff (2010) wrote a short experiential report about using Google Wave (a now-defunct Google app with largely communicative features) and Google Docs for a group collaboration project. Her team's objective was to organize a conference presentation virtually, without having to meet in person. While a few members shared concerns about the privacy function of an online application to perform this type of work, their concerns were alleviated after they became more familiar with the privacy options in Google Docs, which enable users to set documents to private so that they have complete control over who can access a document. The report mentioned quite a few positives: the team members were able to work at any location during convenient, asynchronous hours. She notes specifically that the functionalities enabled the team to avoid excessive emails and conference calls. The author concludes that it is very much possible to use Google's apps to manage a small to medium sized project. As with any unfamiliar software, she notes, there will be some convincing of participants to "buy in" and a small learning curve before getting up to speed. However, in this group's experience, the pros greatly outweighed the cons.

The previously mentioned study by Harris (2016) also supports the notion that these tools are meeting their users' demand. Converse to the Riley-Huff (2010) report, in which those who participated were all professionals, the participants in the Harris study were graduate students in an online course. The author notes that in a comparative analysis of the students'

evaluation of the Google tools versus a traditional LMS, neither site was indicated to be exceedingly superior than the other; however, students reported easy of navigability and improved interaction in the course, and 93.2% agreed that they enjoyed the experience. Suwantarathip (2014) found higher score gains in a Google Docs collaborative writing ability and noted similar functionalities that could have contributed to this: first, the commenting ability, the ability to help fellow students without restrictions of time and place, and the recording of contributions. All of these characteristics contributed to the students' experiences. Each of these characteristics can also be considered as meeting demands of accessibility (freedom of time and place) and collaborativity (commenting ability, contribution recording).

In contrast, Kai-Wai Chu's (2011) study evaluated whether MediaWiki and Google Docs are perceived as effective online collaboration tools by student users. A final sample of 14 student respondents reported above-midpoint (on a scale of one to five, five being "very much so") enjoyment and suitability for co-construction of group projects for their experience with Google Docs. However, on that scale, both "improvement of collaboration among group members" and "improvement of group report quality" scored slightly under the midpoint. This suggests that while students viewed these products as suitable to be used, they did not think that the tools provided any impact on the collaborative process itself. Indeed, a separate study found that when required to use Google Drive to compile a final project for an online course, upper level STEM students met in person to discuss the project even though no face-to-face meeting was required (Mehlenbacher 2015). In evaluative memos of their experiences with Google Drive, students reported a common concern that the communicative interactions were actually subpar: the new media environment and not being able to view fellow group members'

engagement was concerning. The authors suggest that in future classroom use, a supplemental media interactive should be required, such as Skype. These concerns could be alleviated by pointing out the Google Hangouts function in the Google suite of apps. Additionally, it is important to note that these concerns were not echoed by practitioners and many other student-focused studies. As stated previously, group formation was repeatedly reported as a positive aspect in the evaluation of online collaborative writing tools.

These considerations are important for the adoption process; just as in any product evaluation, it is important to embark on new software practices with an open mind and a clear idea of the needs and goals of the project. In SaaS tools (specifically Google Docs), the highest predictor of both perceived usefulness of and satisfaction with these types of tools in a mandatory adoption environment was confirmation with expectations (Tan 2015). An important part of the new software adoption process, as Riley-Huff noted as well, is the "buy in". While the Tan (2015) study did not investigate the sources of the factors of confirmation, satisfaction, and perceived usefulness in their survey, they took an important step towards identifying the main factors affecting user acceptance of these tools.

Conclusions

The above patterns point out important characteristics and considerations when evaluating the use of OCWTs. However, only a third of users who chose a certain collaborative tool had done so based on its features (Behles 2013). As such, accessibility can be deemed the number one hurdle when narrowing down to using a certain OCWT.

Students particularly are generally unenthusiastic about adding a new website to access to their daily routine (Harris 2016). In progress reports about actual group assignments, only five technologies were mentioned as having been used in practice: email, cell phones, IM, Facebook, and a file-sharing service (Kalin 2012). Research on how students use OCWTs should be conducted with specific goals in mind; otherwise, as shown in multiple studies above, the "collaborative" aspect of online collaborative writing tools will get lost in the wind.

The literature is still fairly sparse with regards to practitioner usage of online collaborative tools. As Behles (2013) and Tan (2015) mention, much of the practitioner usage of certain specific tools is prescribed by company IT departments. As such, even though important TPC workflows and efficiency measures depend so much on document accessibility, maintenance, and interactivity, practitioners must work within their own company's prescribed software. Future research should take this limitation into consideration, especially in surveys. As companies continue to adopt cloud software for further connectivity, investigations should take place into why these companies are choosing specific products and if they can better meet their TPC employees' needs by allowing them to freely choose their everyday software.

Finally, it should be noted that although studies on both student and practitioner usage of OCWTs have been included in this paper, a conscientious effort should be made to understand the differences between the two. Nearly half of the literature examined in this review focused primarily on student experiences, and it is understandable why; students are effectively free study participants who can be required to use certain software mediums for tasks that fall under the broad umbrella of collaborative writing. However, the practitioner-focused studies were primarily based in surveys. This is a poor methodology for truly

understanding the cases in which OCWTs are used in the workplace. Future studies should involve case studies and participant observation if we are ever to gain a true perspective and assist in organizational decision-making with regard to OWTs.

References:

Alcántara, Jesús Muñoz, Panos Markopoulos, and Mathias Funk. "Social media as ad hoc design collaboration tools." *Proceedings of the European Conference on Cognitive Ergonomics 2015*. ACM, 2015.

Behles, Jessica. "The use of Online Collaborative Writing Tools by Technical Communication Practitioners and Students." *Technical Communication*, vol. 60, no. 1, 2013, pp. 28-44.

Briones, María de los Ángeles. "Information Design for Supporting Collaborative Communities." *The Design Journal*, vol. 20, no. sup1, 2017, pp. S32-62.

Caspi, Avner, and Ina Blau. "Collaboration and Psychological Ownership: How does the Tension between the Two Influence Perceived Learning?" *Social Psychology of Education*, vol. 14, no. 2, 2011, pp. 283-298.

Ferro, Toni, and Mark Zachry. "Technical communication unbound: Knowledge work, social media, and emergent communicative practices." *Technical Communication Quarterly*23.1 (2014): pp. 6-21.

Harris, Rachel S., and Charles B. Hodges. "Using Google Tools for Online Coursework: Student Perceptions." *IEEE Transactions on Emerging Topics in Computing* 4.3 (2016): pp. 385-391.

Kai-Wai Chu, Samuel, and David M. Kennedy. "Using Online Collaborative Tools for Groups to Co-Construct Knowledge." *Online Information Review*, vol. 35, no. 4, 2011, pp. 581-597.

Kalin, Jason. "Doing what comes naturally? Student perceptions and use of collaborative technologies." *International Journal for the Scholarship of Teaching and Learning* 6.1 (2012): article 10.

Kim, Jongwoo, Kannan Mohan, and Balasubramaniam Ramesh. "Functional and nonfunctional quality in cloud-based collaborative writing: An empirical investigation." *IEEE Transactions on Professional Communication* 57.3 (2014): pp. 182-203.

Levenberg, Ariella, and Miri Barak. "A table for four: Collaborative writing in shared cloud documents." Proceedings of the 10th Chais Conference for the Study of Innovation and Learning Technologies: Learning in the Technological Era. Raanana: The Open University of Israel. Google Scholar. 2015.

Mehlenbacker, Brad, Meagan Kittle Autry, and Ashely Rose Kelly. "Instructional Design for Stem-Based Collaborative, Colocated Classroom Composition." *IEEE Transactions on Professional Communication* 58.4 (2015): pp. 396-409

Perron, Brian, and John Sellers. "A review of the collaborative and sharing aspects of Google Docs." *Research on Social Work Practice,* vol. 21, no. 4, (2011), pp. 489-490.

Redish, Janice. "Technical communication and usability: Intertwined strands and mutual influences." *IEEE Transactions on Professional Communication* 53.3 (2010): pp. 191-201.

Riley-Huff, Debra A. "Using Google Wave and Docs for Group Collaboration." *Library Hi Tech News*, vol. 27, no. 4/5, 2010, pp. 12-14.

Suwantarathip, Ornprapat, and Saovapa Wichadee. "The Effects of Collaborative Writing Activity Using Google Docs on Students' Writing Abilities." *Turkish Online Journal of Educational Technology-TOJET* 13.2 (2014): pp. 148-156.

Tan, Xin, and Yongbeom Kim. "User Acceptance of SaaS-Based Collaboration Tools: A Case of Google Docs." *Journal of Enterprise Information Management*, vol. 28, no. 3, 2015, pp. 423-442.

Vallance, Michael, Phillip A. Towndrow, and Charles Wiz. "Conditions for successful online document collaboration." *TechTrends* 54.1 (2010): pp. 20-24.

Zhou, Wenyi, Elizabeth Simpson, and Denise Pinette Domizi. "Google Docs in an Out-of-Class Collaborative Writing Activity." *International Journal of Teaching and Learning in Higher Education* 24.3 (2012): pp. 359-375.