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Isolation and Onboarding: Gender Bias in Aviation Training Documents

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“Isolation and Onboarding: Gender Bias in Aviation Training Documents”
William Hart, Minnesota State University-Mankato

Abstract

There is a growing interest in male-dominated industries and the challenges women face finding their place within the workplace community. Yet, there seems to be little research on how training documents, generally created by technical communicators, may isolate and limit women who seek to pursue careers in these fields. Technical communication and gender scholars have examined women in the technical communication field and gender bias in male-dominated industries but have not yet examined gender stereotypes in training documents. Training documents are designed to provide written instructions and a reference guide for job functions, workplace rules, orientation, and company policies. This is sometimes the first opportunity for an employee to better understand the culture of the company and what it offers. Technical communicators, such as instructional designers, generally create the training material based on the goals of an organization with input from subject matter experts. This study examines FAA (Federal Aviation Administration) technical training documents, specifically focusing on manuals, handbooks, and guides found on the FAA website. The documents analyzed were published between the years of 1941 and 2017 and were all accessible on the FAA website at the time the documents were chosen. Factual and implied gender reference categories emerged from the data. A number of biased gender references were prevalent in documents created as recent as 2017. Gender bias was not only isolated to the role of the pilot but was also present in the description of other roles, including examples of professions outside the field of aviation. Qualitative analysis further revealed complex and frequently stereotypical portrayals of aviation roles and examples found in curriculum. The results highlight how technical writing functions as gender bias and serves as the basis for further investigative studies of gender bias in technical documents.

Keywords

Gender stereotypes, technical writing, technical communication, aviation, gender bias, curriculum

Training documents are meant to provide written instructions and act as a reference guide for job functions, workplace rules, orientation, and company policies. This is sometimes the first opportunity for an employee to better understand the culture of the company and what it offers. Technical communicators, such as instructional designers, generally create training materials based on the goals of an organization with input from subject matter experts. As women continue to strive toward the glass ceiling of inequality at the workplace to shatter it, instructional designers must continue to identify opportunities to remove gender barriers from technical documents.

Segregation in the workplace based on gender, as well as gender inequity in leadership roles and wages have been previously observed and documented (Padavic & Reskin, 2002). Additionally, research has identified workplace discrimination as a primary impediment on gender equality (Gorman, 2005). There is a growing interest in male-dominated industries and the challenges women face finding their place within the workplace community. Yet there seems to be little research on how technical training documents may isolate and limit women who seek to pursue careers in these fields.

Scholars generally agree that cultural beliefs are the foundation of discrimination against women in the workplace, followed by organizational structures, policies, and practices (Ridgeway & England, 2007). This study attempts to add to the discussion of gender bias by focusing on gender inequality found in technical documents, specifically aviation training documents.

While women have made progress in education, medicine and law, the field of aviation and other technical occupations have remained somewhat immune to the changing gender roles in professions (Germain, Herzog, & Hamilton, 2012). One reason the glass ceiling persists is that women and men receive different developmental experiences during their careers (McDonald & Hite, 1998).

With an extensive online library and as the principal federal agency responsible for providing information regarding the largest, safest and most complex aerospace system in the world, the Federal Aviation Administration (FAA) provides an interesting case study in which to explore how gender bias is found in aviation technical instructional documents. In recent studies on gender bias, gendered pronouns (e.g., she, he) have been identified as excellent markers for gender in text, because they are easy to detect, and occur with a very high frequency in most contexts (Pennebaker et al., 2003; Twenge et al., 2012). This study attempts to identify the use of preferred gender nouns and pronouns in the FAA's technical training documents in order to further the understanding of gender bias in technical documents and provide tips for how to create inclusive rhetoric.

Review of the Literature

Gender bias has received increased attention by scholars in business, politics, communication, and many other academic disciplines. Although gender has been studied in several areas of communication including health communication, business communication, intercultural communication, and political communication, there seems to be an absence of research focused on gender bias in training documents. The online availability of federally distributed instructional documents by the FAA provides an ideal context to identify and examine these stereotypes. To examine the trends in technical documents and gender bias, a review of literature identifying stereotypes of occupations, gender inequality in technical documentation, and how framing theory can help further the discussion of perceptions is required within the community of technical communication.

Stereotypes of Occupations

Scholars have extensively researched gender stereotypes in occupations. Men and women have always had distinct roles to play in society, with women's roles historically associated with the home-caretaking sphere (Emslie & Hunt 2008). Jobs are thought to become gender-typed as male or female based on either job responsibilities that are believed to be gender-linked (Heilman, 1995) or on the sex of the usual job-holder (Cejka & Eagly, 1999). Male-dominated fields tend to not welcome females by creating a negative environment compared to other disciplines (Ward, 2008). In these environments, women face a host of obstacles to their career success, including social isolation from male peers (Xie & Shauman, 2003), less opportunities for advancement, and less representation at top levels (Valian, 2004).

In the automotive industry, for example, the percentage of female employees remains stagnant at just 17% of all employees (National Automobile Dealers Association, 2016).

According to Women in Automotive (WIA), although a major recruiter received over 1,000,000 resumes, of which over 40% were from women, only 1 out of 4 was actually hired by dealers (2018). In the organizational culture of police work specifically, control and segregation severely limit a woman's ability to enter the field; feel accepted, valued, and capable; bond with peers; advance through promotion; and ultimately be retained by the department (Anker, 1997). According to the Federal Aviation Administration, there are 700,000 certified pilots, 6% of whom are women (Hamilton, 2013).

All of these gender studies in different male-dominated occupations point to several conclusions. First, gender-specific job stereotypes still exist and impact the job outlook for women in certain industries. Second, there are more negative stereotypes of women in male-dominated industries than positive stereotypes. Third, women are interested in careers in fields historically represented by men, but face discrimination as early on as the hiring process and throughout their careers, even at the executive level.

Gender Bias in Technical Communication

Technical communication researchers have identified sexist language in several studies, including masculine bias in a stun gun owner's manual (Sauer, 1994) and gender bias in naval fitness reports (Shenk, 1994). Researchers continue to analyze the degree to which gender identity has affected technical writings, in order to continue to reduce limitations of gender role to meet the growing demands for equality in business.

Results concerning gender in technical documentation reinforce the need for additional research. Scholars have researched bias as the enemy of a good audience analysis (Ceccio & Rossi, 1981) and the differences in language usage by men and women (Lynch & Strauss-Noll, 1987). However, this study seeks to add to the body of research of gender bias and the technical communication field by identifying gender bias in technical documents and identifying ways to overcome bias by creating more inclusive writing. Technical documents should serve the reader and provide an inclusive learning experience, regardless of gender.

Overcoming Bias in Technical Communication

In their research, Miller and Swift introduced sexism in language by noting that resistance to more nonsexist ways to communicate is blanketed by the idea that changing language can be seen as an affront to the purity of language (1988). Double-pronouns (his or her) were identified as a substitute for male pronouns but, as Miller and Swift note, these can be wordy and distract from the message. While this is a better option than assuming male pronouns as a generalization, ultimately Miller and Swift agree that eliminating pronouns is the preferred action to create nonsexist content (1988). In her research, Dr. Wilcoxon noted that when discussing both subtle and blatant sexism in language, "failing to recognize even the subtlest demonstrations of linguistic sexism could impede one's service to clients, one's professional reputation, and one's self-awareness of blind spots concerning gender prejudice or stereotyping" (1989).

In Wendy Martyna's study (1978) of the generic use of "he," she concludes that even if the writer intends for "he" to be generic, there is no guarantee that it will be understood that way. Because "he" is ambiguous, exclusive, and inequitable, the use of the term as a universal pronoun is not only confusing, but also regularly misunderstood by the reader, leading to bias (Martyna, 1978).

Because the English language doesn't currently have a gender-neutral third-person singular personal pronoun, "they" has been argued by English and Communication scholars as an alternative for the generic use of "he" and the clunky "he/she" alternatives. The singular use of "they" is widely accepted as appropriate for anyone who does not identify as male or female or when gender may identify someone who would like to remain anonymous. Formal writing and style guides have made several changes recently but are inconsistent in their acceptance of "they" as a singular pronoun. Instead, all recommend rephrasing the statement to eliminate confusion. The APA specifically does not recommend using combinations (s/he, (s)he, and he/she), "he" or "she" alone, or alternating between "he" and "she" because of the confusion it causes the reader (The Use of Singular "They" in APA Style, n.d.a).

Framing Gender

As a primary frame that structures social relations (Ridgeway, 2001), gender operates at multiple levels to shape the experience professionals have in the workplace. Gender is one of the primary means for differentiating and categorizing individuals in order to create shared knowledge that transcends situations and groups (Ridgeway, 2001). Scholars have used framing theory to explain the ways that information is framed to influence the way that audience members think about identity categories including age, gender, race, and nationality (Atkinson & Herro, 2010). Gitlin (1980) defines frames as devices that facilitate how writers organize enormous amounts of information and package them effectively for their audience.

Entman (1993) furthers the discussion of framing by explaining that, "to frame is to select some aspects of perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described." Framing demonstrates that accentuating certain considerations in a message can influence individuals to focus on those particular considerations (Druckman, 2001). Frames magnify particular aspects of a situation while excluding other elements, which could lead to both intentional as well as unintentional persuasion of the audience.

Research Design and Methodology

The presence of gender bias, no matter how subtle or blatant, in male-dominated training material deserves the attention of scholars. Research has also indicated the existence of gender bias in the aviation field (Germain, Herzog, & Hamilton, 2012). Researchers have not focused much analysis on the representation of gender-specific nouns and pronouns in training materials and taken into account how older documents exist as a current recommendation, which is problematic. As a first step, this study examines the FAA's list of recommended aviation handbooks, manuals, and guides, addressing two research questions: (a) How frequent are male-specific pronouns used in training documents compared to female-specific pronouns? and (b) Does the training material have a tendency to tilt toward the preference of male pilots based on the language used within the documents?

Background on FAA

The Federal Aviation Administration (FAA) remains the principal federal agency responsible for providing the largest, safest and most complex aerospace system in the world. Since 1958, the FAA has overseen all aspects of civil aviation in the United States, ensuring the

safety of the traveling public. A safe aviation system is the lifeblood of our nation's economy. Every day, more than 50,000 commercial airliners and general aviation airplanes take off and land safely in the United States, connecting people and ideas. Aviation has become the international language of commerce, and runways have enabled inland cities to become vibrant ports. As stewards of this remarkable industry, the FAA shares an enormous responsibility to run today's aviation system while charting a safe course for our nation's airspace of the future (faa.gov, n.d.a).

There are a variety of things that users can search for on the FAA website (www.faa.gov) including safety guidelines, airport information, flight information, and training documents, to name a few. There are a number of factors that make aviation training manuals the optimal documents to explore gender bias in the technical training documents. Because of its online availability of training documents for the aviation field, the FAA website creates a unique opportunity to examine training documents recommended by a government agency for a male-dominated field.

Selection of Artifacts for Analysis

To obtain the technical documents, I located the documents posted on the FAA website by selecting "Training & Testing" on the homepage. Next, I selected "Get pilot training information." Finally, I selected "Aviation Handbooks & Manuals" from the bulleted list. As the researcher, I recognize that there are other documents on the FAA website that are worthy of analysis, but these documents were chosen for their location under "Aviation" and their placement as a list of training resources. Of the initial 38 documents listed, 22 documents were selected because they were listed as "manual", "handbook", or "guide." Documents range in date of publication from 1941 to 2017. Each was downloaded for further analysis on January 16th, 2018.

Coding Process

First, I read all the training documents to better understand the material being covered. While I am not a pilot and some of the aviation terms were foreign to me, I was not reading the documents to learn the process, but instead to get an idea of the samples and scenarios used within the texts. Using the "Find" function of the Microsoft Office Word software, each document was searched for key terms and phrases to identify the instances of gender mentioned. Terms were searched as a single word and with punctuation including: period (.), colon (:), question mark (?), and semi-colon (;). Using the coding process from similar research in aging, two major categories emerged: factual gender and implied gender (Atkinson & Herro, 2010). Factual gender was identified as gender as a description of an actual person that was being cited or mentioned in the text (using "he" as a pronoun for Aristotle). Implied gender was defined as any use of gender where the context was fictional (hypothetical examples and scenarios).

Analytical Methods

Content analysis is a research methodology that has been widely used in the social sciences in general (Stock, 2007). It is a way of asking a fixed set of questions unflinchingly of all of a pre-determined body of writings, in such a way as to produce countable results (Carney, 1972). Researchers, using content analysis, can search for patterns that occur in selected texts. Analyzing quantitative content revealing how many pronouns there are in a given context may say something about gender status (Twenge et al., 2012). Gendered pronouns (e.g., she, he) are

excellent markers for gender in text, because they are easy to detect, and occur with a very high frequency in most contexts (Pennebaker et al., 2003; Twenge et al., 2012). Terms that were initially used to identify gender bias in the chosen documents were: he, him, his, himself, she, her, hers, and herself. Lastly, a qualitative analysis helped identify many sexist ideas about pilots and uncovered sexist terms used to describe professions outside the aviation field. For each document I attempted to determine if there was a preferred gender listed. In particular, the research looked for:

- The use of male pronouns (he, him, his, himself) versus female pronouns (she, her, hers, herself)
- Analysis of illustrations in the technical documents
- Expectations that team members are male (using he-pronouns to describe other roles)

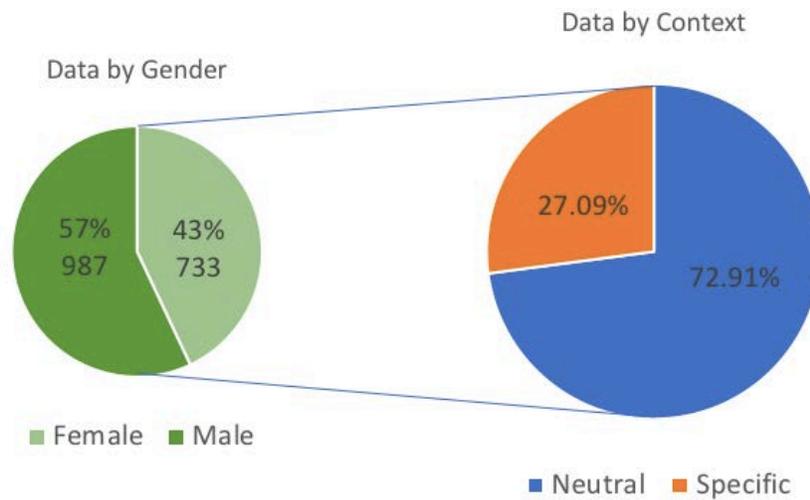
Based on the above information, quantitative and qualitative content analysis, and similar research looking at age bias using frame theory (Atkinson & Herro 2010), three major themes were established. Gender preference based on age and relevance of document, gender as information only, and gender with judgement were the identified themes that emerged. The first was preferential male gender pronouns in each document based on the age and relevance of the document. Second, gender as information only. Nouns, pronouns, and illustrations were analyzed in relation to factual identification of male and female historical figures found in the content.

Finally, the use of gendered pronouns was analyzed for judgements associated with the mention of gender, thus illuminating any gender bias in the training documents. Researchers have used a qualitative approach in similar studies to illuminate stereotypical ideas about gender, and in certain cases uncovered a complex linguistic strategy in which negative stereotypes of gender were used to compliment the opposite sex (Burkley, et al., 2015). As past framing scholars have identified in their research (e.g., Atkinson & Herro, 2010), references to gender and the associated judgements tell aviation students and instructors not only what to think about the preferred gender of a pilot, but also how to think about gender (whether it be the gender of a pilot, instructor, aviation professional, or other professional). Similar findings were noted in this research and are discussed below.

Results

The first research question asked how many references were made to gender, and overall, there were 1,720 references to gender found in the documents. 987 occasions of male nouns and pronouns were identified while 733 occasions of female nouns and pronouns were noted. (See Table 1)

Table 1

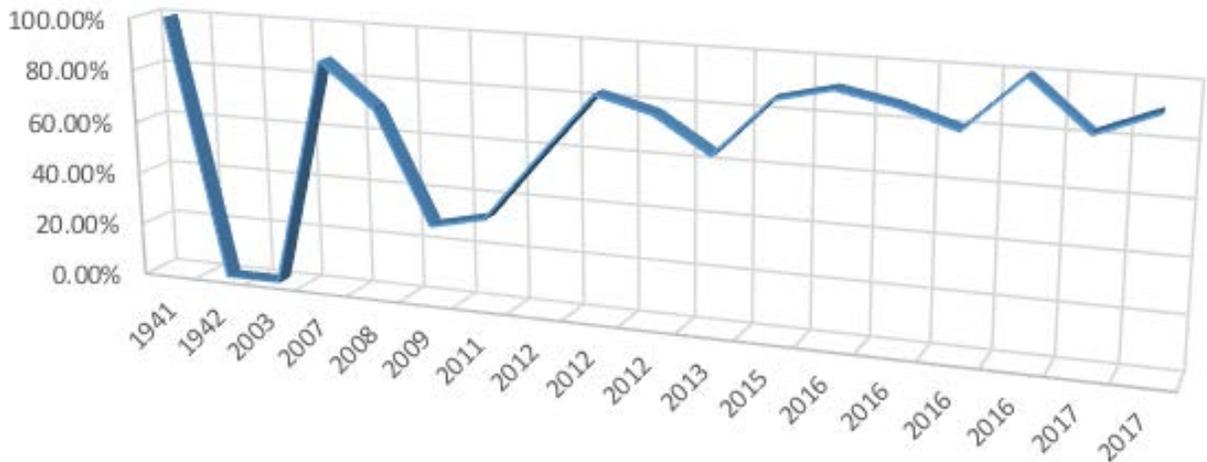


A total of 72.91% nouns and pronouns were coded as gender neutral due to the use of subjective, objective, and possessive double pronouns that were gender inclusive (ex: “he or she”, “his or her”, “him/her”, “himself or herself”) and 27.09% were coded as gender specific.

Of the 22 documents examined, 81.8% (18) contained gender identification while 18.2% (4) contained no mention or implication of gender. There are more consistent attempts to be gender inclusive in documents after 2011 but bias is still found in documents as recent as 2017(See Table 2).

Table 2

Percentage of Gender Neutral Terms by Year



It is important to note that there were no documents published between 1942 and 2003 so the x-axis does not represent an even timeline, instead a timeline with years of publication.

The second question asked whether or not the learning documents had a tendency to tilt toward the preference of male pilots based on the language used within the documents, and the simple answer to this is absolutely, though not always. The qualitative analysis that follows investigates various themes that arose from the presence of gender in the technical aviation training documents listed on the FAA website.

Gender by Relevance

Some of the gender references provided in the training documents are due to the age of the document and the outdated use of male and female pronouns. For example, “It is particularly important that the pilot check the controls and adjust the tension of the lines as required before take-off and before landing otherwise he may find himself without enough control in an emergency (“K-Type Airships” 1942 p.49).” This document, released in 1942, was for the K-airship built by the Goodyear Aircraft Company for the United States Navy. The last K-ship was retired in 1959 (blimpinfo.com, n.d.a.) and the first class of women naval aviators would graduate almost 15 years later in May, 1973 (Women in Aviation, 2018). “There is then an unbalanced moment which tends to give the airship an angular acceleration and so to turn her more and more rapidly” (“Airship Aerodynamics,” 1941 p.46). In this document from 1941, the k-ship is referred to by the female pronoun, “her.” This is the only female pronoun listed in the document and could possibly be due to the use of she-pronouns to personify vessels in the feminine gender (Mellefont, 2000). In these references, the technical documents are outdated since the airship no longer exists, hence the dated gender references and lack of updates since 1941. Even though they are outdated, these documents were still published on the FAA website and therefore have an impact on the reader and were analyzed.

Gender as Information

A few articles referred to gender as factual information of experts cited in the document: “Dr. David Keirseley condensed their sixteen types into four groups he calls Guardian, Artisan, Rational, and Idealist (Aviation Instructor’s Handbook 2008 p.1-2)” and “Henry A. Murray, one of the founders of personality psychology who was active in developing a theory of motivation, identified a list of core psychological needs in 1938. He described these needs as being either primary (based on biological needs, such as the need for food) or secondary (generally psychological, such as the need for independence) (Aviation Instructor’s Handbook, 2008 p.1-3).” In these references, gender was mentioned as a factual reference for the expert described in the content. While this study is not focused on identifying opportunities to substitute female aviation experts for male, an increased number of male experts cited in these training documents were noted and I recommend the need for further research of opportunities to include more female citations to balance expertise.

Gender Bias of Student

Some of the gender references provided examples of bias by assuming that the student was exclusively male. For example, one scenario read, “You are a 32-year-old, 325-hour, non-instrument-rated private pilot. You have about 75 hours on long cross-country flights including one less than 3 weeks ago. You and your wife are planning to leave after work for a 400 (nautical mile) flight to attend your wife’s best friend’s 11:00 AM wedding the next day. You will take off about 30 minutes before sunset” (Risk Management Handbook, 2009, p. B-1). In this reference, the implication is that the student would have a wife. It is important to note that there were no examples where the student would have a husband, therefore disproving the argument that “wife” does not always equate to a male gender preference. In this example, one of the recommendations for the pilot is to buy a plane ticket for the wife in order to reduce the stress of having a wife that wants to go to a party but may miss it due to flying conditions. While the example implies that the student is male, it also implies that the wife is unreasonable and would not be able to prioritize safety over a wedding.

Gender Stereotypes of Women

In the other examples found in this handbook, the wife needs to use the restroom and refuses to use the portable urinal that pilots sometimes carry. The example, “You are tired and hungry, and your wife has mentioned a need for a bathroom, and she is not about to use one of those plastic things you carry in your flight bag (Risk Management Handbook, 2009, p. B-2),” the pilot must choose between safety or telling the wife no. In another sample, the pilot must choose between safely flying his family to a destination or choosing an option that is not as safe in order to justify purchasing of the plane to the wife.

Gender Bias in Illustrations

Another document uses only male illustrations and while it makes no indication of gender in the written context, there is no indication that the student could be anything but male (MC-4, 2003).

Mixed Gender References

There are several examples of attempts to be gender neutral but in the same example that has gender neutral pronouns, the student is implied to be male by a masculine pronoun that is

isolated from a female pronoun. An example is, “A student obtains his or her pilot’s license with the minimum number of hours...now, with a new license, the pilot visits his parents in the middle of the high desert of Colorado (Weight-Shift Control Aircraft Flying Handbook, 2017).” The example begins gender neutral but then uses the male pronoun “his” when identifying the parents. It’s important to note that of all 1,687 gender pronouns listed in the training documents, there was no examples of content defaulting to female pronouns after gender neutral pronouns were used.

In one example, the title of “Captain” dictated that a fictitious character from a 2006 article would have a male pronoun. In the example, “In the case of Captain Everyman, after a gear-up landing accident, he became involved in another accident while taxiing a Beech 58P Baron out of the ramp” (Risk Management Handbook, 2009, p. 2-3), the pronoun “he” is used to describe Captain Everyman, even though the subject is not a real person and there is no other mention of this character that would explain the gender except for the title and name. The very idea of “Captain Everyman” is exclusive, as though there is “one” right way to be a pilot.

Gender Bias of Other Professions

There are also examples of stereotypes for other professions found in different training documents. On page 4-5 of the “Helicopter Flying Handbook,” an example of an ice skater is described discussed, “As the skater moves her arms in, she spins faster because her inertia changes but her total energy remains constant (neglect friction for purposes of this explanation).” This statement stereotypes ice skaters as female which is the only time a title is defaulted to a female gender. In contrast, “Remote Pilot—Small Unmanned Aircraft Systems Study Guide” uses the example of a quarterback, “A good example is a quarterback whose actions are based upon a highly fluid and changing situation.” He intends to execute a plan, but new circumstances dictate decision-making on the fly. This type of decision-making is called automatic decision-making or naturalized decision-making (p. 59). This example assumes that a quarterback will be male based on stereotypical images of football players.

Gender Bias of Other Aviation Professions

Other noted gender bias included preferred male pronouns for other aviation roles found in the technical documents. In “Flight Navigator Handbook,” the example, “The operator identifies radar returns on his radar scope and measures the range and bearing to the return” (2011 p.16-3) refers to an operator as male when the correct pronoun should have been gender inclusive in order to accurately portray an operator as able to be either gender. In “Instrument Procedures Handbook” (2017), an example is, “The pilot told the controller that the reason for the descent was to cross the VOR at 17,000 feet. ATC (air traffic control) advised the pilot that he did not have clearance to descend” (p. 2-51). In this example, even though it is a made-up scenario, the assumption is that the pilot is male, and a stereotype immerses.

Gender-specific Terms in Curriculum

Finally, there were examples identified where gender-specific terms were used in the curriculum. In the “Aviation Instructor’s Handbook,” (2008) one note for the instructor is, “Instructors should keep in mind that they are often salesmen of ideas, and many of the best sales techniques that attract the attention of potential clients are well worth considering” (p. 4-23). The more commonly used “salesperson” was abandoned for a term that specifically identified the gender of the instructor. In another example from the same training document,

“Pilots who think, What’s the use?” do not see themselves as being able to make a great deal of difference in what happens to them. When things go well, the pilot is apt to think that it is good luck. When things go badly, the pilot may feel that ‘someone is out to get me,’ or attribute it to bad luck. The pilot will leave the action to others, for better or worse. Sometimes, such pilots will even go along with unreasonable requests just to be a “nice guy.” (p.8-17)

Again, a gender stereotype emerges that the pilot is male and therefore, identifies as being the “nice guy.”

Across the span of 76 years that these technical training documents represent, gender bias can be identified in the majority of documents, including the documents published in 2017. All of these examples indicate clear, consistent and stereotypical frames for the gender of pilots (and sometimes the gender of other aviation professions). The emphasis on male pronouns creates a set of technical documents that assume pilot instructors and students are, by default, male. There does seem to be attempts to be gender-inclusive, but stereotypes still emerge, sometimes in the same document and even within the same example.

Discussion and Conclusion

This study revealed that there were gender-specific terms used throughout the curriculum. If gender identifications were for fact only, then consistency would be expected or, at least, a pattern of increased gender-neutral pronouns over time. As framing scholars have found in communication studies (Entman, 2007), the gender reference and the associated contexts tell the reader what and how to think about the gender of aviation professions.

Stereotypes of women as stress-inducing and not physically compatible with piloting a plane emerged from the analysis. These samples were used to explain scenarios where pilots must make decisions and choose safety over disappointing a spouse. These stereotypes have the ability to create conflict amongst staff members, instructors, students and pilots.

Stereotypes of other professions generally considered masculine and feminine indicates that the authors gender bias is not specific to aviation only, but gender stereotypes in general. The stereotypes are not new, but what is new concerns the implications of gender bias in training documents. These documented biases have the ability to influence the audience’s attitudes toward women entering aviation and the overall training process. Documentation like this is powerful in recreating bias and creating a feeling of unwelcome for newcomers who don’t fit the stereotypical “pilot” mold. While proving a cause-effect relationship could be suggested for further investigation, it is safe to conclude that documentation is merely one additional way in which minorities in aviation are reminded that they are “other.”

There seems to be subtler ways that the writers encouraged gender bias. The default to male pronouns in this study does just that. These references, being found in government-suggested training documents, could create a significant, negative impact. The scope of this study did not include examining the impact these documents have on gender bias in the aviation field since the influence of gender bias in aviation has been supported by other studies (Germain, Herzog, & Hamilton, 2012).

This study has limitations that could possibly be addressed for future research. There were themes that emerged, but further examination of those themes was not in the scope of this research to explore including implied language regarding the behaviors of pilot’s wives as well

as implied gender bias of jobs in the aviation field other than the pilot. This research focused on specific bias, which meant that it excluded bias of race, age and nationality. Another study could identify the race of characters in the photographs in order to frame bias in a different, but significant way. Finally, contextual analysis does not illuminate the effect on the audience (Atkinson & Herro, 2010). Do the readers of these documents identify bias based on the terms found within the text? Do female aviation students think that the training documents fail to represent them as pilot and pilot students? How do these gender stereotypes impact the appeal of being a pilot for female prospects?

Additional research could involve comparing classroom training as these could be more inclusive depending on the instructor and how he/she feels about women pilots. It would also be interesting to interview female pilots and pilot instructors including those that now have the opportunity to begin their training in the military which, historically, has not always been a career path. The researcher also recognized an opportunity to focus further research on job titles found in aviation and the implied sexism using the suffix -men and -man.

Framing theory suggests that how the gender of the pilot is presented to the reader influences how the audience process that information. Frameworks of aviation students and instructors constitute a central element of its culture (Goffman, 1974). The online training documents found on the FAA website provides an interesting case in which to examine gender framing in technical documents. Instructional designers are in a position to impede the damage that is done through the hidden, and sometimes intentional, messages that gender bias creates. Instructional designers should strive to critically analyze their own attitudes and behaviors about gender roles.

Based on the current recommendations of scholars and style guides, the use of editing and revising in order to create sentences that do not require a gender-neutral third-person singular personal pronoun is the ideal way to create gender-inclusive technical documents. When a term is necessary, scholars agree that combining both singular pronouns (he or she, she or he, his or her, her or his, etc.) is the most acceptable way to remove bias in gender from technical documents. Based on the research, I agree and exemplify below how changing sentences can create inclusive writing and still have the same desired outcome for the reader:

Example 1:

“You are a 32-year-old, 325-hour, non-instrument-rated private pilot. You have about 75 hours on long cross-country flights including one less than 3 weeks ago. You and your **wife** are planning to leave after work for a 400 NM flight to attend your wife’s best friend’s 11:00 AM wedding the next day. You will take off about 30 minutes before sunset” (Risk Management Handbook, 2009, p. B-1).

Revised 1:

“You are a 32-year-old, 325-hour, non-instrument-rated private pilot. You have about 75 hours on long cross-country flights including one less than 3 weeks ago. You and your **spouse** are planning to leave after work for a 400 NM flight to attend your spouse’s best friend’s 11:00 AM wedding the next day. You will take off about 30 minutes before sunset” (Risk Management Handbook, 2009, p. B-1).

By removing “wife” from the example and adding “spouse,” the statement removes gender bias and creates an inclusive scenario where spouse can equal husband or wife.

Example 2:

“A student obtains his or her pilot’s license with the minimum number of hours...now, with a new license, the pilot visits **his parents** in the middle of the high desert of Colorado” (Weight-Shift Control Aircraft Flying Handbook, 2017).

Revised 2:

“A pilot obtains his or her pilot’s license with the minimum number of hours...now, with a new license, the pilot visits **a town** in the middle of the high desert of Colorado” (Weight-Shift Control Aircraft Flying Handbook, 2017).

By changing “parents” to “a town,” which doesn’t require the possessive third person pronoun “his,” the example is made inclusive. The revision utilizes both male and female gender pronouns when necessary, remaining inclusive and still serving the same purpose.

Example 3:

“The operator identifies radar returns on **his** radar scope and measures the range and bearing to the return” (2011 p.16-3)

Revised 3:

“The operator identifies radar returns on **his or her** radar scope and measures the range and bearing to the return” (2011 p.16-3)

By changing “his” to “his or her,” the gender of the operator does not need to be specified and can remain gender neutral and more inclusive.

The ability for technical communicators, such as instructional designers, to identify and remove gender bias from training material will help create inclusion and diversity. This study furthers the understanding of how frames created within technical training documents may reflect and/or perpetuate stereotypical attitudes toward gender. The analysis identified and introduced a new and important examination of gender stereotypes and how technical writers can identify and avoid writing that implies preference to a specific gender.

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